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Construction Methods

McGRAW-HILL PUBLISHING COMPANY, INC. • PRICE 20 CENTS

AT ARMY ORDNANCE WORKS constructors erect arch roof forms and weld reinforcement for concrete storage structure.

APRIL
1942

Weldon Spring Ordnance Works Involves 450 Buildings and Vast Service Facilities

Temporary Office Buildings House Washington's War Workers

Road Building Contract Places Cash Value on Time

Airport Construction • Timber Bridge • Oil Pipe Line • Windowless Aircraft Plant

There is Magic in "Scrap"

Help Overcome the Critical Shortage!

Are you listening to America's call for scrap—scrap, the magic metal that can be melted and refined into steels for the fighting forces of America and her Allies?

Charging scrap into furnaces is not a new steelmaking method. It has been practiced for years, conserving millions of tons of valuable iron ore resources. Last year scrap collecting facilities made available 25,000,000 tons to help maintain the output of America's steel plants. The need is so urgent, however, that even greater effort must be applied so that all steelmaking furnaces can operate at full capacity.

Make a search for scrap throughout your plant. You may find discarded machinery, a rusty shaft, a broken rail, a twisted beam, an old boiler, an obsolete crane, an unused switch track, a steel trussed building too costly to repair and use. What about the "bone pile," where odds and ends have been rusting for years?

Possibly you can find only a few pieces of scrap, weighing only a fraction of a ton. **Start them on the way to a steel mill!** Your local scrap dealer, gathering a piece of scrap here, and one there, will soon fill a car. Carloads from other dealers will grow into a trainload. Trainloads arriving at mills will assure steel output at capacity.

Remember that 50 pounds of steel means another 105 mm. shell; 25 tons another tank; and, 25,000 tons will place a new cruiser and several cargo ships under the American flag.

Time and materials are precious to our men on the fighting fronts. Do not handicap them—answer America's call today—send your scrap to be refined into useful steel.

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

CURRENT JOBS

.... and Who's Doing Them

BUILDINGS

Public — In Texas, War Department awarded a $38,000,000 plant contract to **W. E. Callahan Construction Co.**, of Dallas. **Cauldwell-Wingate Co.**, of New York, received contract for military housing in Atlantic Southeast, for $34,331,329. Low bidders for military housing project in Colorado were **Colorado Springs Constructors, Inc.**, with bid of $30,054,029. Another military housing project is under way in Pacific Northwest by **Sound Construction & Engineering Co.**, of Seattle. **Peter Kiewit & Sons**, of Omaha, Neb., **Morrison-Knudson Co.**, of Boise, Idaho, and **Ford J. Twaits Co.**, of Los Angeles, Calif., for $27,500,000. Manufacturing plant is under construction in Arkansas, by **H. B. Deal & Co., Inc.**, of St. Louis, Mo., for $23,000,000. **A. Guthrie & Co., Inc.**, of St. Paul, Minn., will build plant in Nebraska for $22,000,000. In Illinois the **Bates & Rogers Construction Corp.**, of Chicago, will erect a plant for War Department at estimated cost of $15,000,000. In Norfolk-Portsmouth, Va., a 5,000-unit demountable housing project will be built by **Barrett & Hilp**, of San Francisco, at cost of $15,336,750. Contract for military housing in California went to **McDonald & Kahn, Inc.**, of San Francisco, for $18,500,000. **Day Housing Corp.**, of New York, was awarded a 2,000-unit prefabricated housing contract in Newport News, Va., for $6,200,000. In Norfolk and Portsmouth, Va., another demountable, prefabricated housing project, comprising 2,000 units, is under construction by **T. C. King Co.**, of Alabama, at an estimated cost of $6,186,780.

In San Diego, Calif., **Fred J. Early, Jr. Co.**, of San Francisco, will build 2,000-unit housing project for $5,668,680; **Midstate Construction Co.**, and **Harris Construction Co.**, both of Fresno, will build a 545-unit housing project for $1,544,219. In New York, **Lummus Co.**, local contractor, received War Department contract for plant for approximately $5,000,000. Depot warehouse is under way in Virginia by **Doyle & Russell**, and **Wise Construction Co.**, of Richmond, at total cost of $5,000,000. A $5,000,000 War Department contract for plant in Ohio went to **Shreve, Anderson & Walker**, of Detroit, Mich.; **Stone & Webster Engineering Corp.**, of New York, received contract to design and construct plant in Pennsylvania, at an estimated cost of $5,000,000. In Cedar Point, Md., flight test center will be built by **Cummins Construction Co. & Riggs Distler & Co.**, of Baltimore, for $5,700,000.

HEAVY CONSTRUCTION

Low bidder for contract to build new Gatun Locks in Canal Zone, was **Rosoff Panama Construction Co., Inc.**, of New York, with bid of $45,705,000. Contract for additional facilities for Navy Yards in Virginia and Pennsylvania went to **Spencer, White & Prentis, Inc., Foley Bros., Inc.**, and **Merritt-Chapman-Scott Corp.**, of New York, for $11,147,280. **Owen, Ames & Kimball**, of Grand Rapids, Mich., received contract for improvements in Middle West, with bid of $8,299,542. Bid of $3,911,000 obtained for **Swenson Construction Co.**, of Kansas City, Mo., contract to build naval training base in Kansas. Successful bidders for floating drydock contract in Alabama were **Paul Doullut** and **J. P. Ewin Construction Companies**, of New Orleans, La., with bid of $2,100,000. Expanding facilities at Navy Yard in Pennsylvania will be under way by **Irwin & Leighton** of Philadelphia, for $2,355,000. Contract for improvements in California went to **Henry J. Kaiser Co.**, of Oakland, for approximately $2,500,000.

HIGHWAYS AND BRIDGES

Among recent highway and bridge contract awards are the following: Alabama: $209,848 to **A. A. Ballew Construction Co.**, of Sheffield; $139,206 to **W. M. Ford Construction Co.**, of Lafayette. California: $696,992 to **N. M. Ball Sons**, of Berkeley; $655,784 to **Clyde W. Wood**, of Los Angeles; $208,477 to **Griffith Co.**, of Los Angeles; $347,975 to **V. R. Dennis Construction Co.**, of San Diego. Illinois: $860,000 to **Eric Bolander Co.**, of Libertyville; $570,000 to **Krahl Construction Co.**, of Chicago. Louisiana: $913,564 to **Barber Bros. Contracting Co.**, of Baton Rouge. Michigan: $695,988 to **Bridgeport Core Sand Co.**, of Saginaw. Ohio: $831,785 to **Hollinger-Davidson Co.**, of Akron; $304,410 to **Lewis & Grisinger Co.**, of Ann Arbor, Mich. Pennsylvania: $2,047,000 to **B. Perini & Sons, Inc.**, of Framingham, Mass.; $526,252 to **F. Donatelli, Inc.**, of Pittsburgh. South Carolina: Approximately $1,000,000 to **Wm. F. Bowe, Jr.**, of Augusta, Ga. Texas: $218,556 to **Austin Road Co.**, of Dallas; $267,110 to **Gulf Bithulithic Co.**, of Houston; $459,993 to **Brown & Root**, of Houston; $476,026 to **Dodds & Wedegartner, Inc.**, of San Benito. Tennessee: $634,095 to **Weymouth Construction Co.**, of Milwaukee, Wis.; $1,084,855 to **R. B. Tyler & Co.**, of Louisville, Ky. Virginia: $271,676 to **W. E. Graham & Sons**, of Cleveland, Ohio; $1,210,770 to **W. H. Scott, Ralph E. Mills Co., Inc.**, and **Carpenter Construction Corp.**, of Franklin.

Grade separation structure and overpass in Washington, D. C., will be constructed by **National Excavation Corp.**, of New York, for $1,285,400. **Melwood Construction Corp.**, of New York, was awarded contract to build bridge over Black River in Maryland, at cost of $722,910. Low bid of $761,938 obtained for **J. E. Haddock**, of Pasadena, two highway grade separations in California.

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A McGRAW-HILL PUBLICATION

The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **BLAST HOUSES**, to protect workers from flying debris, were built of logs cut from hillsides near damsite. —p. 39
How **HUGE ORDNANCE WORKS** were built with speed on 17,000-acre site. —p. 42
How **CONSTRUCTION PERSONNEL** were organized to handle ordnance works construction. —p. 42
How **DRINKING WATER** was distributed to workers on large project by wood-stave tank on dump truck. —p. 44
How **DIESEL-ELECTRIC SETS** supplied temporary power to construction job. —p. 47
How **BATCHING PLANT** was arranged to load 2-yd. truck mixers in 17 seconds. —p. 47
How **PANEL FORMS** were handled on concrete arch roof for igloo-type storage unit. —p. 48
How **WELDING OUTFITS** made joints in 30 mi. of pipe line. —p. 50
How **WELL-POINT INSTALLATION** dried up trench for laying water main. —p. 53
How **ASPHALT RUNWAYS** were built to serve municipal airport. —p. 54
How **GEAR-DRIVEN SPREADER BOX** distributed crushed stone for airport runway paving. —p. 54
How **STEEL WAS CONSERVED** by building county bridge of lumber. —p. 55
How **A TIME CHARGE** was included in list of bid items on defense highway contract. —p. 57
How **TEMPORARY OFFICE BUILDINGS** were built quickly to house war workers. —p. 58
How **ARC WELDING** saved 20 percent of steel for plant building. —p. 59
How **PUMPED CONCRETE** was distributed to forms for dual waterway conduit. —p. 60
How **LIGHT-REFLECTING SURFACES** were formed on white cement highway curb. —p. 60
How **SHIFTING OF CEMENT CARS** at batching plant was done by tractor-bulldozer unit. —p. 61
How **SHOVEL TEETH** were reconditioned by hard surfacing with stainless steel welding electrode. —p. 61
How **HEAVY MOVING METHODS** were used to transfer 75-ton concrete block. —p. 62
How **OIL PIPE LINE** was built through difficult terrain. —p. 63
How **SHEETPILE DRIVING** was aided by guide frame and slotted hammer guides. —p. 67

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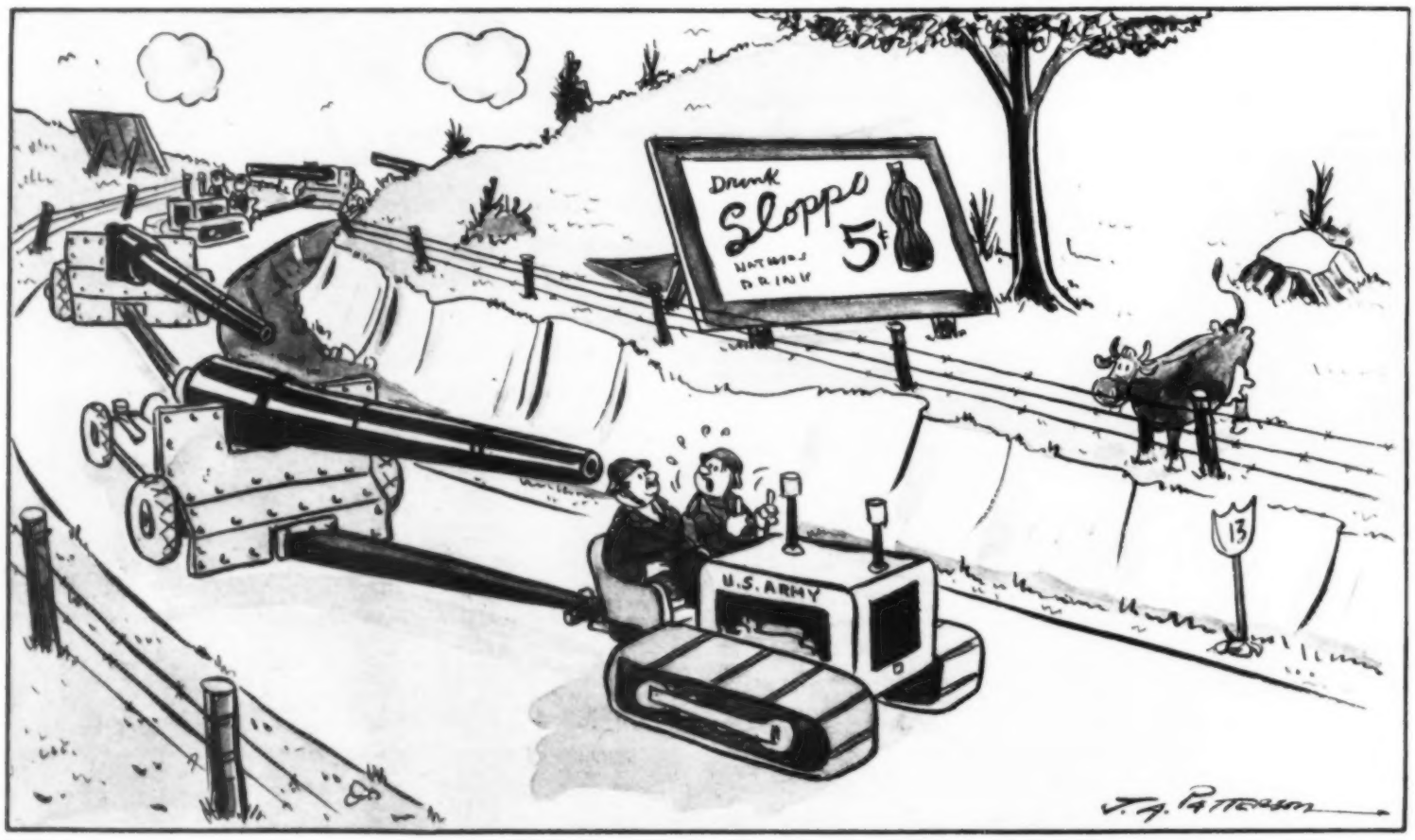
THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"Now that there's a rubber shortage, we expect you to get about 75,000 miles out of this tire!"



"I never use'ta get nervous when I was drivin' one of these tractors for the state highway department."

SAVES 4 WEEKS AND $8255

Contractor: Corbetta Construction Co., New York;
Architect-Engineer: Victor Mayper, New York

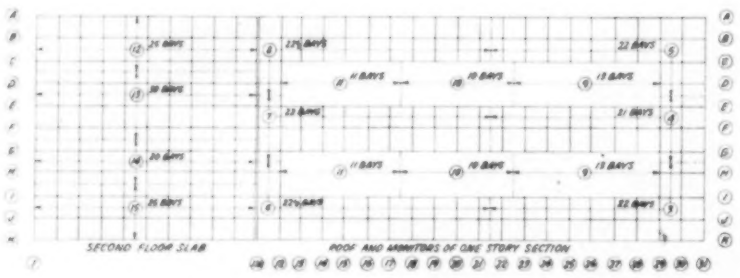
JOB SCHEDULE

POUR NO.	LOCATION		NUMBER OF BAYS	EXCAVATION, FOUNDATION GRADE	FORM	REINFORCING AND TRADES	CONCRETE	STRIP	REUSE AT
1	ONE STORY BUILDING	1ST FL.	32½	SEPT. 21	SEPT. 25-26	SEPT. 25	SEPT. 27	SEPT. 30	3-4
2		1ST FL.	32½	" 23	" 25-26-27	" 26-27	OCT. 1	OCT. 2	4-5
3		ROOF	22	-	SEPT. 30 OCT. 1	OCT. 1-2	" 2	" 4	6
4			21	SEPT. 30	OCT. 1-2	" 2-3	" 3	" 7	7
5			22	OCT. 2	" 3	" 4	" 7	" 9	8
6			22½	" 3	" 4	" 7	" 8	" 10	9
7			22	" 5	" 7-8	" 8	" 9	" 11	9-10
8			22½	" 8	" 9	" 10	" 11	" 14	10-11
9		MONITOR	26	-	" 10	" 11	" 14	" 16	12
10			20	-"	" 11	" 14	" 15	" 17	12-13
11			22	-	" 14-15	" 15	" 16	" 18	13
12		2ND FL.	25	OCT. 15	" 16	" 17	" 18	" 21	14
13	TWO STORY BLDG		30	" 16	" 17-18	" 18-21	" 22	" 24	15-16
14			20	" 18	" 21	" 22-23	" 24	" 28	17
15			25	" 22	" 24	" 25	" 28	" 30	18
16		ROOF	18	-	" 25	" 28	" 29	" 31	19
17			32	-	" 28	" 29	" 30	NOV. 1	19
18			26	-	" 30	" 31	NOV. 4	" 6	-
19		MONITOR	24	-	OCT. 31 NOV. 1	NOV. 4	" 5	" 7	-

FLOORS ON EARTH ONE STORY BLDG WK. END NOV. 1
FLOOR " " 2-STORY " " " " 9

BASIS OF SCHEDULE:
FORMS ARE FURNISHED FOR 68 BAYS. 'INCOR' CEMENT TO BE USED, PERMITTING COMPLETE STRIPPING 2ND MORNING AFTER POUR. THE 68 BAYS ARE USED FOR 3 DAYS POUR WITHIN SAME CALENDAR WEEK. ALL BAYS FOR GIRDERS, BEAMS AND SLABS ARE COMPLETELY REUSABLE EVERYWHERE.

Utilizing 'Incor's 24-hour service strength and forming only 15% of the area, a carefully prepared progress schedule enabled Corbetta Construction Co., Inc., to complete this factory building in record time—at minimum cost. This job shows that form economies are possible on one- and two-story buildings as well as on multi-story structures.



Planning with 'Incor' Produces Top Speed at Minimum Cost

SPEED is the need of the hour. Good job planning and 'Incor' 24-Hour Cement save vital weeks and often reduce construction costs.

As a result of careful planning, Crawford Clothes factory, occupying an entire city block in Long Island City, New York, was completed in record time—at minimum cost.

Corbetta Construction Co., Inc., general contractors, estimated this one- and two-story building, of reinforced concrete beam-and-girder design, on the basis (1) of forming 50% of the required area, or (2) by using 'Incor' 24-Hour Cement and forming about 15% of the area. Either method meant a time saving of about 4 weeks over usual schedules. *But 'Incor' showed a net cost saving of $8255, as against the extra forms needed for the same construction speed.*

'Incor'* was used in the frame; elsewhere Lone Star was used. The job was completed in record time—faster speed at lower cost. Write for copy of "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2266, 342 Madison Avenue, New York.

*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

Offices: ALBANY · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · HOUSTON · INDIANAPOLIS · KANSAS CITY · NEW ORLEANS · NEW YORK · NORFOLK · PHILADELPHIA · ST. LOUIS · WASHINGTON, D. C.

It's up to YOU *to Move the Earth* — to HELP AMERICA WIN!

THERE'S a war to be won! Uncle Sam needs landing fields, defense highways, ordnance plants, factories — quick!

Time is *everything!* So men and machines are working faster than ever before. And rubber is carrying the load. On projects from coast to coast "tough job" tires designed by B. F. Goodrich are helping contractors "move the earth" to help America win. As giant machines wheel mountainous loads over any kind of surface — even jagged rocks -- these tires stand up under unbelievable punishment day in and day out.

B. F. Goodrich research has played a leading role in the development of tires to meet the grueling requirements of the construction industry. Today, as a result, you can always find in the B. F. Goodrich line a tire specially designed to meet the operating conditions of *your* particular job. A tire that will deliver better service *longer*—help you to conserve rubber for America's war effort and save money in the bargain!

In addition to the BEST TIRES "ON EARTH," B. F. Goodrich-made hose, belting, accessories, and footwear are popular favorites wherever there's construction. For a single, dependable source of supply for *all* your rubber product requirements . . . see the B. F. Goodrich man *first!*

. . . GET THIS *FREE* TIRE GUIDE NOW!

You don't have to be an expert to choose the "just right" tires for your particular job with this book to guide you. Describes each off-the-highway tire in detail, tells the type of service it's designed for, and the type of equipment it's to be used on. Gives tips on tire care and maintenance that will help you conserve rubber and at the same time cut your tire bills way down. For your *free* copy write The B. F. Goodrich Company, Akron, Ohio, *today!*

Earth Service Silvertown
The last word in surefooted traction. Balanced, non-skid, self-cleaning tread design.

Rock Service Silvertown
Rugged, closely-knit tread resists cutting. The best tire for quarrying, strip mining, rock excavating.

Universal Super-Traction Silvertown
Gives universal traction forward and backward. Extra-heavy tread and sidewalls for resistance to cutting.

In war or peace

B.F.Goodrich

FIRST IN RUBBER

It's no part-time job that those of us behind the lines are working on—it's one that demands maximum output from every machine and every piece of equipment. Time and productive capacity are wasted when equipment lies idle or isn't used to the best advantage—*and we can't tolerate waste now.*

In the material moving field—whether it is earth, rock, or mine products—Euclids have proved their extra speed and capacity and their trouble-free performance in non-stop production. That's the kind of efficiency that is imperative today, and that's why we believe every owner should "keep the 'EUCS' rolling" day in and day out.

If your Euclids have finished their part of a job, arrange to move them to another one without delay. Should you have no immediate use for your Euclid equipment, you can render a real service in the war program by leasing or renting to a contractor who has urgent need for hauling units. Let us know if you have Rear-Dump or Bottom-Dump EUCLIDS to lease or rent, or if you need additional units for a current or future job. We'll try to help by acting as a clearing house for this information.

★

Euclid Distributors in every section of the country, as well as factory parts depots at Cleveland, Memphis, Hibbing, and San Francisco, are ready to help "keep the 'EUCS' rolling" for peak production by supplying replacement parts and service promptly.

★

The EUCLID ROAD MACHINERY Co. • • CLEVELAND, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT for EARTH · ROCK · COAL · ORE

"CEMENT DISPERSION..

F. H. MARTIN CONSTRUCTION CO.,
DETROIT, WRITES:

"Reduced water content between 15% and 20% . . .

Had a very workable concrete. . . .

Coupled with High Early Strength qualities . . .

Were able to *speed up* construction . . .

Effected savings in *labor* and *materials* on the job."

Pozzolith 32 page illustrated book tells how Cement Dispersion brings important cost and construction advantages, *whatever your concrete requirements.* Write for a copy today!

THE MASTER BUILDERS CO.
CLEVELAND, OHIO — TORONTO, CANADA

"SAVED DAYS . . . SAVED DOLLARS"
Writes General Contractor

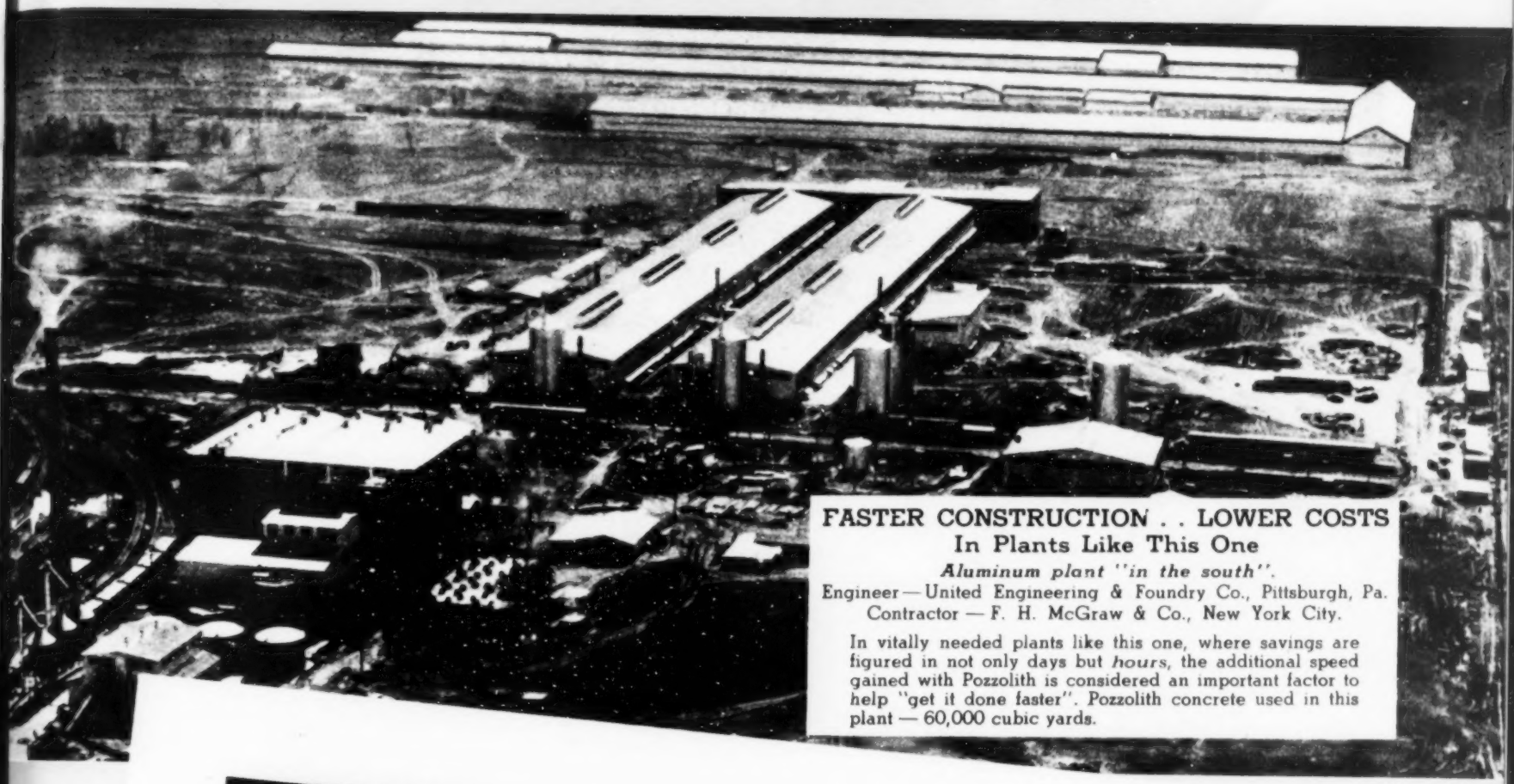
Aviation plant "in middle west".
Architect — Albert Kahn, Inc., Detroit Michigan.

"Having a very workable concrete, coupled with High Early Strength qualities, we were able to speed up construction, which permitted a more rapid re-use of our forms, shores, etc., *and effected a savings in labor and material on the job.*"

F. H. Martin Construction Co., Gen. Contr., Detroit, Mich.

MASTER

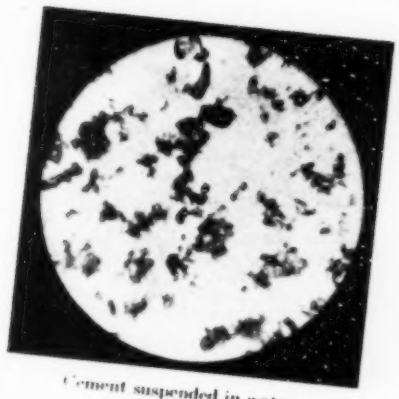
Saved DAYS AND DOLLARS"... SAYS CONTRACTOR



FASTER CONSTRUCTION . . LOWER COSTS
In Plants Like This One

Aluminum plant "in the south".
Engineer — United Engineering & Foundry Co., Pittsburgh, Pa.
Contractor — F. H. McGraw & Co., New York City.

In vitally needed plants like this one, where savings are figured in not only days but *hours*, the additional speed gained with Pozzolith is considered an important factor to help "get it done faster". Pozzolith concrete used in this plant — 60,000 cubic yards.



Cement suspended in water
UNDISPERSED

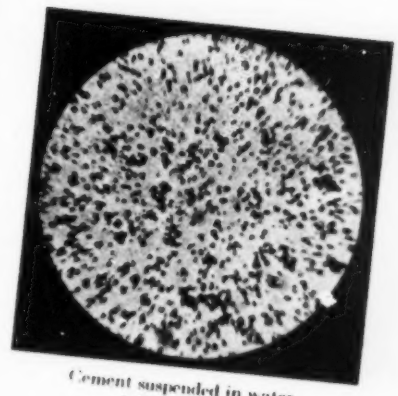
WITHOUT POZZOLITH

In a normal concrete mix, cement particles tend to bunch together, thereby (1) limiting hydration and (2) trapping water within the cement clumps. (See photomicrograph above).

HOW CEMENT DISPERSION WORKS

Only a part of the cementitious value of the cement, whether normal portland or high early, is utilized under usual construction conditions. Investigation shows that with 28 days curing only 50% hydrates. [Anderegg and Hubbell, A. S. T. M. 29 II 554 (1929)].

Dispersed cement produces 25% to 40% higher compressive strengths.



Cement suspended in water
DISPERSED

WITH POZZOLITH

Cement Dispersion drives these particles apart and (1) exposes their entire surface area to hydration, at the same time (2) making the water entrapped in the clumps available for lubrication of the mix. (See photomicrograph above).

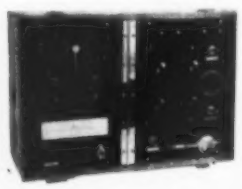
BUILDERS

The field for the application of strain measurement is so broad and the variety of gages and auxiliary equipment available so great, that the selection of the proper instrument for the specific job is often confusing. Care is essential in making this selection for satisfactory results. Of the many types of gages and auxiliary equipment available, a few are illustrated below.

ELECTRIC STRAIN GAGES

Here are three types of electric gages that are widely used to measure strains in propellers, bridges, buildings, dams, towers, and other engineering members.

Illustrated: SR-4 Bonded Metalectric, Electro-Magnetic, and Ess or Strip Gages.



B-S WHEATSTONE BRIDGE CONTROL BOX

A necessary and exceedingly accurate instrument for the measurement of static or slowly applied stresses.

AMPLIFIER AND OSCILLOGRAPH

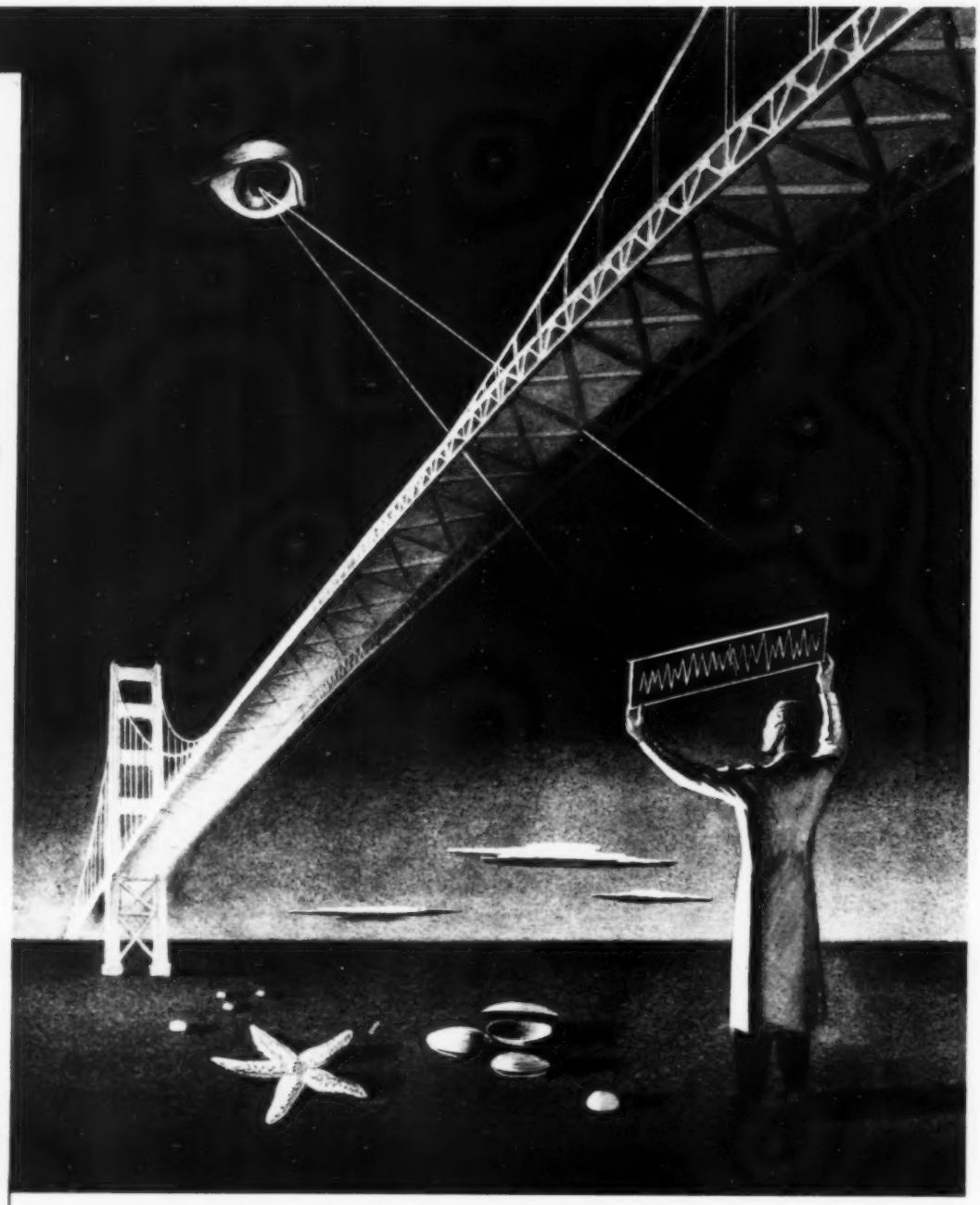
Where strains occur in short-time intervals, amplifiers are required to "step-up" or amplify the output of electric gages. The nature of the strain and type of gage govern the choice of amplifiers.

An oscillograph or recorder is necessary to obtain permanent records of strains. The Crystal pen and ink Oscillograph shown above is one of several available recorders.

Illustrations: Baldwin-Southwark; Brush Dev. Co.; General Electric; deForest.

• • •

Other testing equipment in the strain measuring group: Waugh Switching Unit to permit quick reading of several gages. Electrical Oscillator, 2000 cycles, for rapidly occurring stresses. Vibragraph for recording displacements. Bernhard Mechanical Oscillator for applying period forces.



His eye can see the strain in a girder's heart

The engineer who is properly equipped can determine the existing strain in any member of any structure. His gage may weigh less than 2 ounces . . . yet it can "look" inside the heart of bridge girder, steel rail, concrete base, or factory floor—and record graphically what it "sees."

WAUGH LABORATORIES makes available a complete line of test instruments and machines, together with an engineering field service and laboratory facilities, for analyzing strains, forces, and vibrations in and on structures.

For information regarding its service application to particular industries, write to Nereus H. Roy, Director, at the address below.

WAUGH *Laboratories*

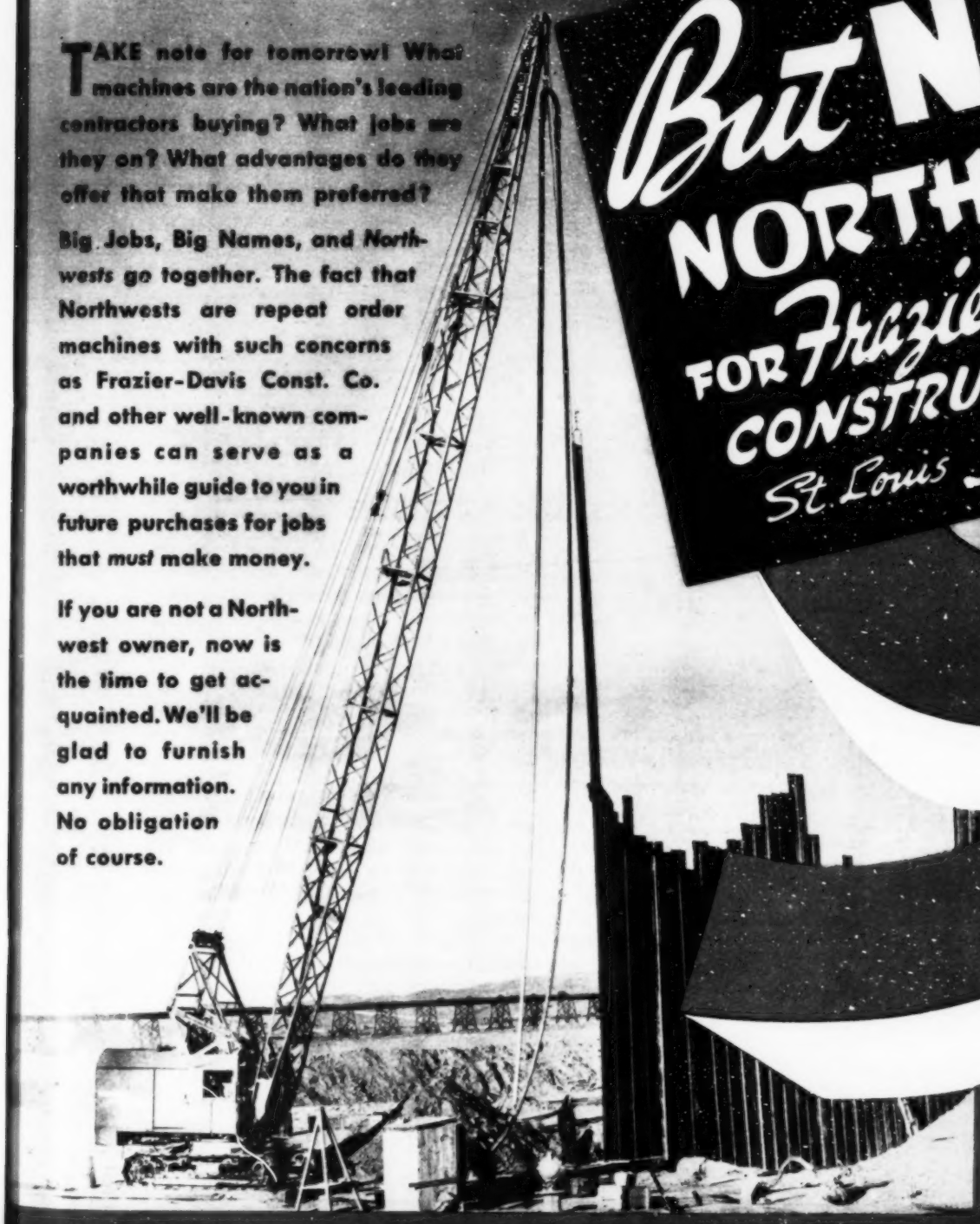
A DIVISION OF WAUGH EQUIPMENT COMPANY • 420 LEXINGTON AVENUE, NEW YORK, N. Y.

Pacific Coast Branch: 714 West Olympic Blvd., Los Angeles, California

Not ONE

Not TWO

But NINE NORTHWESTS FOR Frazier-Davis CONSTRUCTION CO. St. Louis, Mo.



TAKE note for tomorrow! What machines are the nation's leading contractors buying? What jobs are they on? What advantages do they offer that make them preferred?

Big Jobs, Big Names, and *Northwests* go together. The fact that Northwests are repeat order machines with such concerns as Frazier-Davis Const. Co. and other well-known companies can serve as a worthwhile guide to you in future purchases for jobs that *must* make money.

If you are not a Northwest owner, now is the time to get acquainted. We'll be glad to furnish any information. No obligation of course.

NORTHWEST ENGINEERING COMPANY
1728 Steger Building
28 E. Jackson Boulevard
Chicago, Ill.

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

CAN WE IMPROVE OUR PREVENTIVE MAINTENANCE PROGRAM?
HOW CAN WE GET MORE MILEAGE BETWEEN OVERHAULS?
ARE OUR COSTS IN LINE WITH OTHERS?

STANDARD OIL'S

FLEET CONSERVATION SERVICE

makes equipment last longer

There's a man who answers questions like those . . . . .

• HE'S the Standard Automotive Engineer. He comes to you with a fleet conservation service that answers many questions raised by the uncertainty of getting equipment replacements. The first and most important is, how can you make your *present* equipment *last longer?* But this question poses many others. Where can maintenance be improved to give longer engine life? Will better cost records help reduce waste? Are wheel bearing, tire, battery, and engine replacements as low as they should be?

The list is endless—and time is short. Why not get all the help you can? Let a Standard Oil Automotive Engineer work with you on these problems.

There are a number of ways one of these Engineers can help. He's familiar with cost systems and modern preventive maintenance methods used by many fleets. He is thoroughly familiar with the latest developments in automotive fuels and lubricants. He knows how these products should perform from his experience on other fleets. If your operation is not up to par, he'll help you find out why.

It will cost you nothing to add this experience and knowledge to yours in answering many of the questions troubling you today. Just write Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago, Illinois, for the Engineer nearest you. In Nebraska, write Standard Oil Company of Nebraska at Omaha.

OIL IS AMMUNITION — USE IT WISELY

Copr. 1942, Standard Oil Company (Indiana)

STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE — LOWERS MILEAGE COSTS

FRANK, WARTIME MESSAGE TO CONTRACTORS AND ENGINEERS

Why It's Difficult to Get LeTourneau Equipment Now

Defend America—that was the 1941 national program. To keep pace, LeTourneau doubled production, delivered 85% to high-rated projects. Practically all of this and some more—95% of our output—was sold through regular LeTourneau-"Caterpillar" dealers for delivery to private contractors working on cantonments, ammunition dumps, airports, etc. That was 1941.

Fleet of C Tournapulls working on an offshore airbase.

Deliveries to Speed Offensive

Today, we are at War, striving desperately to take the Offensive. Our Government has asked us to increase production. LeTourneau expects to build 50% more equipment in 1942 than ever before. Most of it will go directly into active combat service with the U. S. armed forces. The remainder will work night and day to construct offshore bases, airports, plane assembly plants, war factories and training camps urgently needed for Offense and Victory.

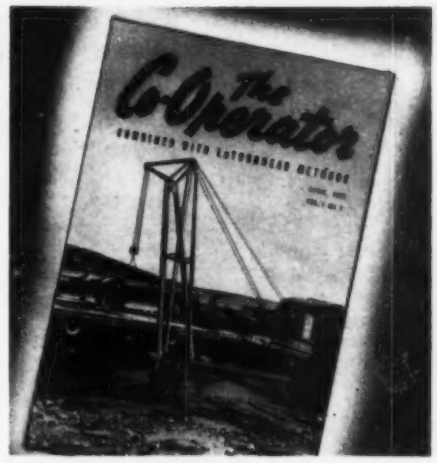
A few of you who are working on these vital Victory projects, will be able to get new equipment. To many, though, the Victory program means using for the duration the equipment you now have.

If, like hundreds of other successful contractors and engineers, you already have LeTourneau Carryalls, Dozers, Rooters and Tournapulls, you're fortunate. That equipment was built stoutly for long life. Thanks to LeTourneau welded alloy steel construction, it's easy to repair; can be economically reconditioned to practically new working efficiency.

Expert Service Available

Your LeTourneau -"Caterpillar" dealer carries a large stock of factory-made parts to serve you with a minimum of delay. He has expert, factory-trained servicemen ready to help you with your equipment maintenance and overhaul problems. Many LeTourneau dealers are equipped with portable welding outfits, to give you time and money-saving service right on the job. All have excellent shop facilities.

So to keep your equipment operating steadily, see your LeTourneau-"Caterpillar" dealer.



BREAKING IN NEW OPERATORS?

Give them *The Co-Operator*—written by and for tractor operators, in the interests of making tractor power go farther through the proper care and use of LeTourneau earthmoving equipment. It's read regularly by over 20,000 operators, engineers, superintendents, foremen and mechanics who want to learn more about:

Equipment repair and maintenance . Cable care, selection and operation . Care of tires . Lubrication . Job layouts, methods of cut, fill, compaction, etc.

The Co-Operator is offered to you and your men absolutely free—10 fact-packed issues yearly. You can get as many copies as you need by writing *The Co-Operator*, R. G. LeTourneau, Inc., Peoria, Illinois. Send . . . NOW!

MOVES FASTER, SAVES $1,000 IN FREIGHT with TOURNAPULLS

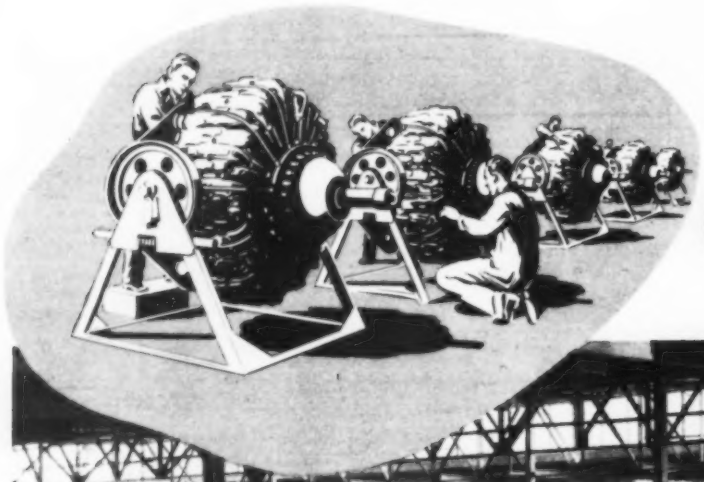
No flat cars were available when Contractor Robert J. Dill had to move 4 Tournapulls (below) from Alabama to Florida — 460 miles away. Big rubber tires on his Tournapulls, plus fast 14 m.p.h. speeds, enabled him to drive the Tournapulls over the highways in 4 days of daytime travel. Results: Mr. Dill writes, "For the total trip, covering salaries of four operators, their expenses, fuel, oil and grease . . . compared with shipping the Tournapulls by freight, plus cost of loading, blocking and unloading . . . we saved approximately $1,000."

War is Won by Work

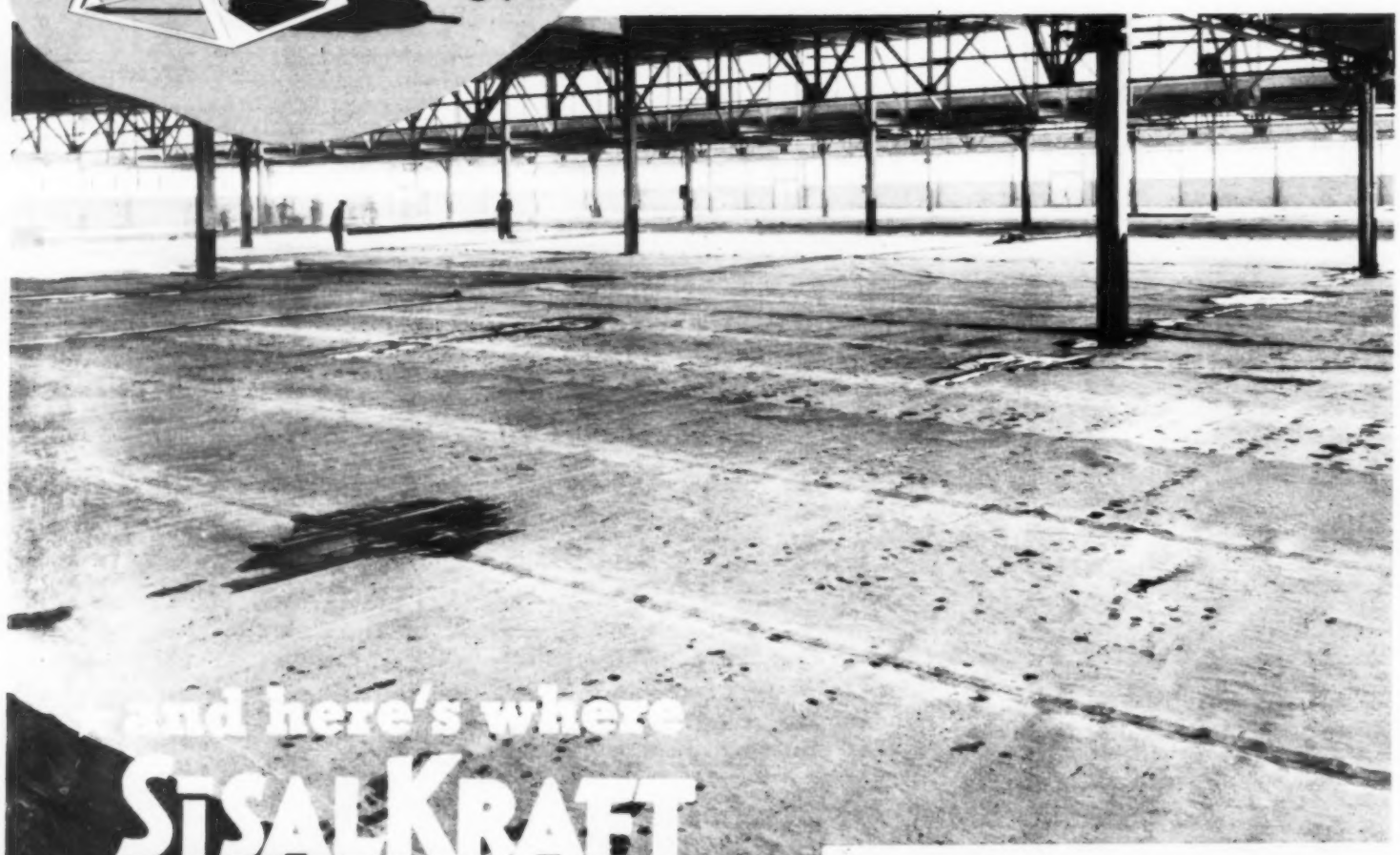
LETOURNEAU

CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, TRACTOR CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*, TOURNACRANES*.

**Name Reg. U. S. Pat. Off.*



• • BEFORE PRODUCTION COMES *Construction*



. . . and here's where SISALKRAFT is doing a Curing Job!

Curing concrete factory floors, airport runways, access roads and structures — closing in — protecting materials, equipment and finished work—in these and numetous other ways, tough, waterproof SISALKRAFT paper is right in the thick of America's tremendous program of war construction.

Quickly rolled out over freshly finished concrete, SISALKRAFT assures thorough curing and effective protection without further attention, saving time, man-power and money. Machinery can be installed right over the paper.

For speed, efficiency and economy in concrete curing — use SISALKRAFT. Use it for low-cost, effective covering and protection on the job. Available for essential war construction needs in rolls, blankets and covers to suit every requirement. Convenient distributors' stocks throughout the country.

Write for engineering data.

The SISALKRAFT Co., 205 W. Wacker Drive, Chicago, Ill.
NEW YORK - 101 Park Ave. SAN FRANCISCO - 55 New Montgomery St.

SISALKRAFT
The Standard Paper for CONCRETE CURING

PROTECTING . . .
material and equipment

. . . for faster, better
DEFENSE HOUSING

Other Methods are too Expensive-

THERE is no question about the economy of Bucket Loaders. For twenty years they have loaded material cheaper than any other method or machine.

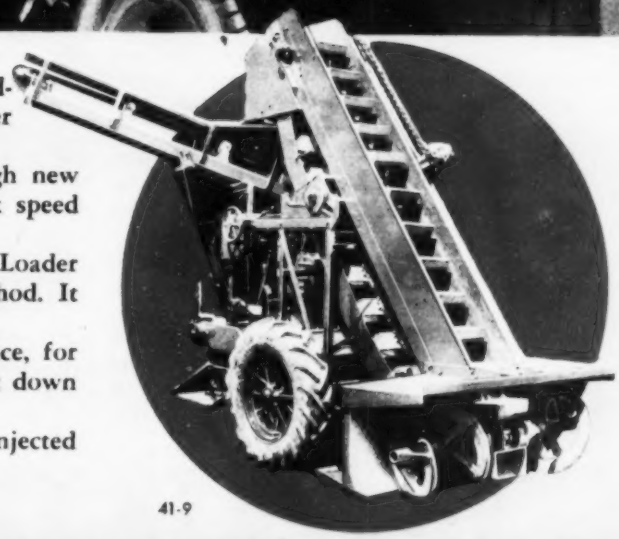
Now the B-G Model 522 offers a new economy through new portability. Not just greater ease in maneuvering—but truck speed towing—with quick and easy hitching—with no dismantling.

This new portability greatly increases the scope that the Loader can cover. It practically obsoletes every other loading method. It makes every other means too expensive.

Simpler systems are now feasible. In highway maintenance, for instance, small roadside stockpiles at the job site can be put down in advance, loaded as needed with the Barber-Greene.

In addition to this new portability, Barber-Greene has injected many other new features into this ingenious design.

Write for complete information. There is no obligation.



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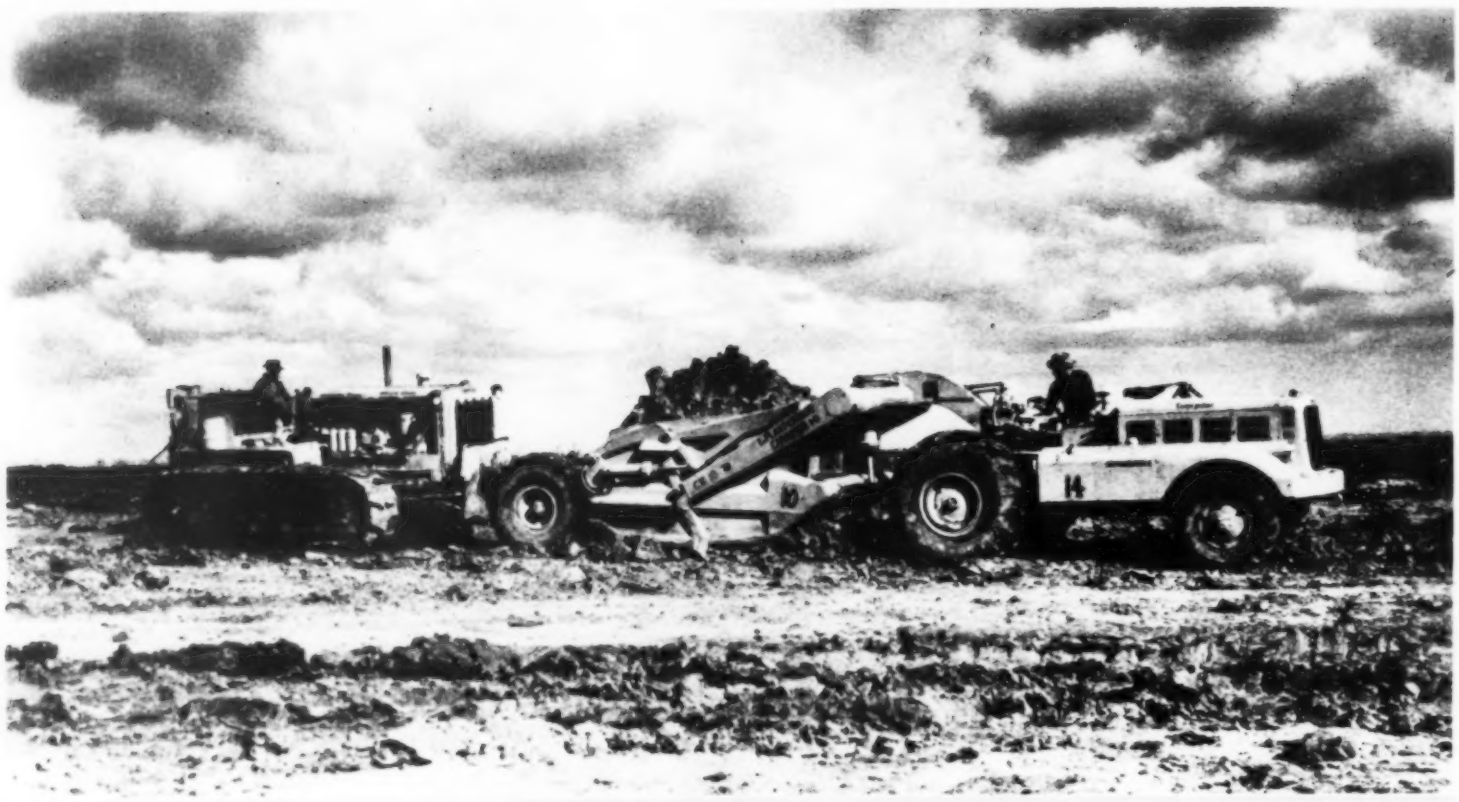
BARBER GREENE
AURORA ILLINOIS



FOR DEFENSE' SAKE!

KEEP EARTH MOVING and KEEP COSTS LOW!

with LaPlant-Choate C.W. 10 "Carrimor" Scrapers . . .

● TODAY, as never before, earth must be moved with speed and at the lowest possible cost. Every day hundreds of thousands of yards are added to the already tremendous total to be moved to make way for airports, factories and other war effort projects.

The CW-10 "Carrimor" Scraper brings high speed and big capacity — 10 cubic yards, heaped — to long haul earth-moving. Thus the LaPlant-Choate line of scrapers now includes machines for every size and type of job.

Although they are self-loading in some materials, pusher loading is generally recommended for greater production and speed. Transporting is fast — five forward speeds up to 18 miles an hour — and they're easy and safe for the operator. Danger from jack-knifing is eliminated, thanks to correct basic design and to correct braking. Dumping and spreading are positive and smooth.

Easy loading is another important feature, and this, in combination with a speed for every road or job condition makes a combination that produces big yardages.

Hydraulic control provides smooth, powerful and trouble-free operation. A touch of the operator's hand raises or lowers the cutting edge—the high lift front apron—or moves the pushout gate in or out. In all these hydraulic operations, the same amount of pressure can be applied to either side of the pistons so the action is positive and powerful in both directions. Precision manufacture has provided minimum clearances between pushout gate and bowl sides and bottom, so dump is complete and clean.

Low center of gravity and good balance provide stability —short turns are easy and easy operation means less operator fatigue resulting in more and better work.

Especially important is the power and strength of this scraper. Preformed, high tensile strength alloy steels and box-type construction provide maximum strength without excess weight. Because of this, no overhead braces are needed, and freedom from these overhead obstructions permit shovel or dragline loading. Thus the outfit can be used as a hauling unit as well as a scraper, when desired.

Although the CW-10 "Carrimor" Scraper was tested and proved for over three years, it has been available only a few months—yet nearly two hundred of them are already in daily use. They are working on scores of jobs vital to the war effort. We'd like to be able to tell you that we could deliver these machines as fast as you are asking for them — but it just can't be done.

They're going out to you as fast as we can make them. The jobs Uncle Sam considers most important get first delivery, of course. We're doing our best today and trying to beat that tomorrow.

DEFENSE PLANT
PART OF THE ARSENAL OF DEMOCRACY
LaPLANT-CHOATE MFG. CO. INC.

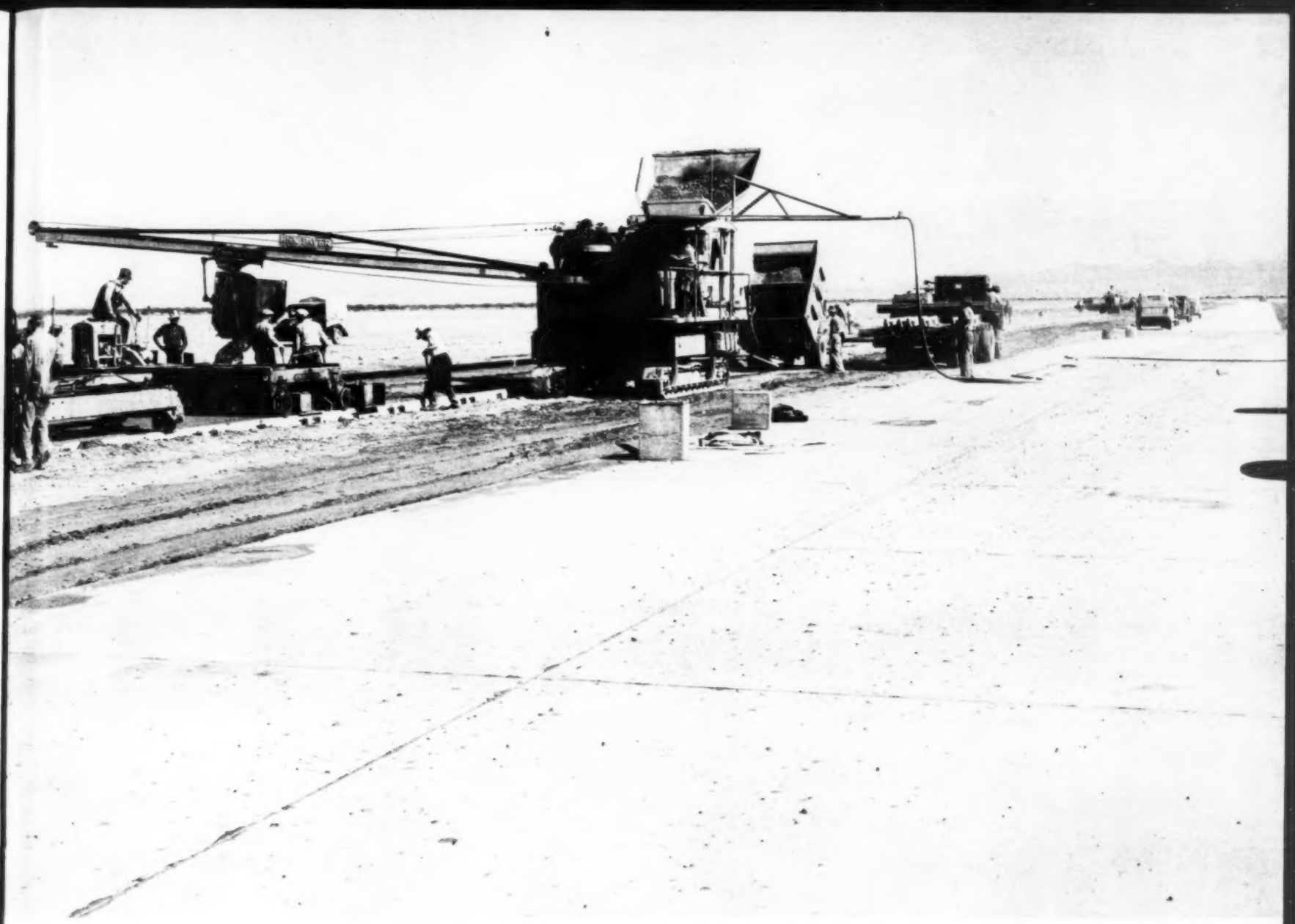
LaPLANT-CHOATE

Factory & Home Office
Cedar Rapids, Iowa

Manufacturing Co. INC.

Pacific Coast Office
San Leandro, Cal.

EARTH MOVING - LAND CLEARING - SNOW REMOVAL EQUIPMENT



BUILDING RUNWAYS... on the Run!

Airports today, highways tomorrow—that's how it is, that's how it will be with the owners of the Rex 34-E Paver—the two-compartment drum paver that's built for speed and built to last!

WHETHER you're building a defense highway or runways for a new airport the performance of the Rex 34-E is grooved to your needs for a paver built for heavy yardage production. And in years to come it will still be the sturdy, efficient machine you want for tomorrow's jobs.

Paver owners the country over have been impressed by the Rex 34-E advantages—its positive batch transfer which is automatically controlled to a split second by the Rex mechanical man; its ease of operation which means its operator can lay down the batches where they're wanted, when they're wanted.

We promise you a new slant on modern paver design—a new outlook on why you should buy a paver today with an eye on tomorrow—in the book, "The Rex 34-E Duomatic Paver." If you'd like to have it, just write 1664 W. Bruce Street, Milwaukee, Wisconsin.

REX PAVERS

CHAIN BELT COMPANY OF MILWAUKEE

MARION *power shovel loading trucks at mine of Sunlight Coal Corporation, Boonville, Ind. Sinclair lubricants used.*

WAR SCHEDULES suffer if equipment is inadequately lubricated. For *CONSTRUCTION MACHINERY* there are . . .

. . . SINCLAIR PENNSYLVANIA and OPALINE MOTOR OILS, specialized gear oils and greases for efficient lubrication in the hard grind of continuous load and overload operation. To keep equipment from laying down in punishing service try Sinclair lubricants. Full details, or lubrication counsel, promptly furnished upon request to nearest Sinclair Office, or Sinclair Refining Company, 630 Fifth Avenue, New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

SINCLAIR LUBRICANTS-FUELS

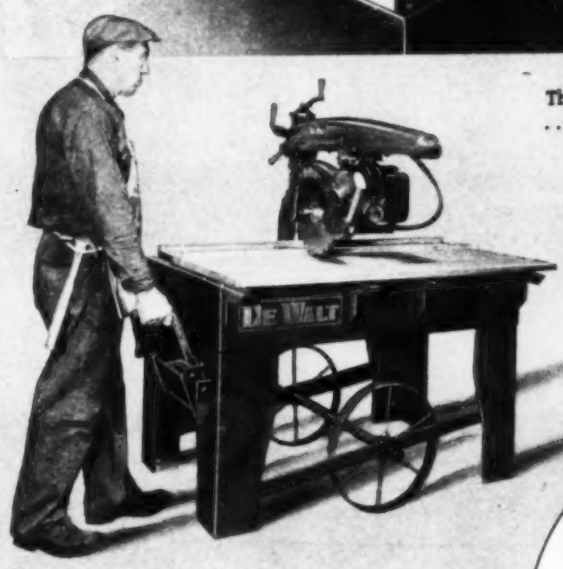
SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • Rialto Bldg., Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

If you are in charge of carpenter maintenance or preparing a new plant for occupancy, this will interest you.

Powerful DEWALT SAW *on wheels* FOR CUTTING YOUR LUMBER

Right On The Job



The top photo shows the DeWalt at work . . . the lower photo shows the carpenter wheeling the saw to the next job.

This new DeWalt saw is ideal for cutting lumber for shelves, bins, partitions, etc., when preparing new plants for occupancy, as it can be rolled from place to place anywhere. Think of the time alone this will save your carpenters. When your plant is completed, put this DeWalt in your carpenter maintenance shop. It's just the right machine to do all of your wood-cutting operations.

With this DeWalt you can make ANY straight line cut, at ANY angle and do it faster and more accurately than any other method. With a DeWalt you draw the saw through the stationary material and do not move the material through the saw. All cuts are made from above the material, where lay-out marks are in plain view. You can cut straight, angle and bevel cross-cuts . . . straight or bevel rip . . . dado . . . tenon, etc., and dozens of other operations.

This DeWalt machine is ideal for your carpenter maintenance shops, shipping rooms, boxing and crating departments and their accurate, smooth cutting, combined with their unusual versatility make them particularly suited for pattern shop work.

DeWalt makes complete line of wood-working machines from ½ H.P. to 15 H.P.

When you need a saw for a job like this you need it in a hurry and DeWalt deliveries will surprise you. Write, wire or phone—

Send for the interesting descriptive booklet — or ask to see action picture of this machine at work.

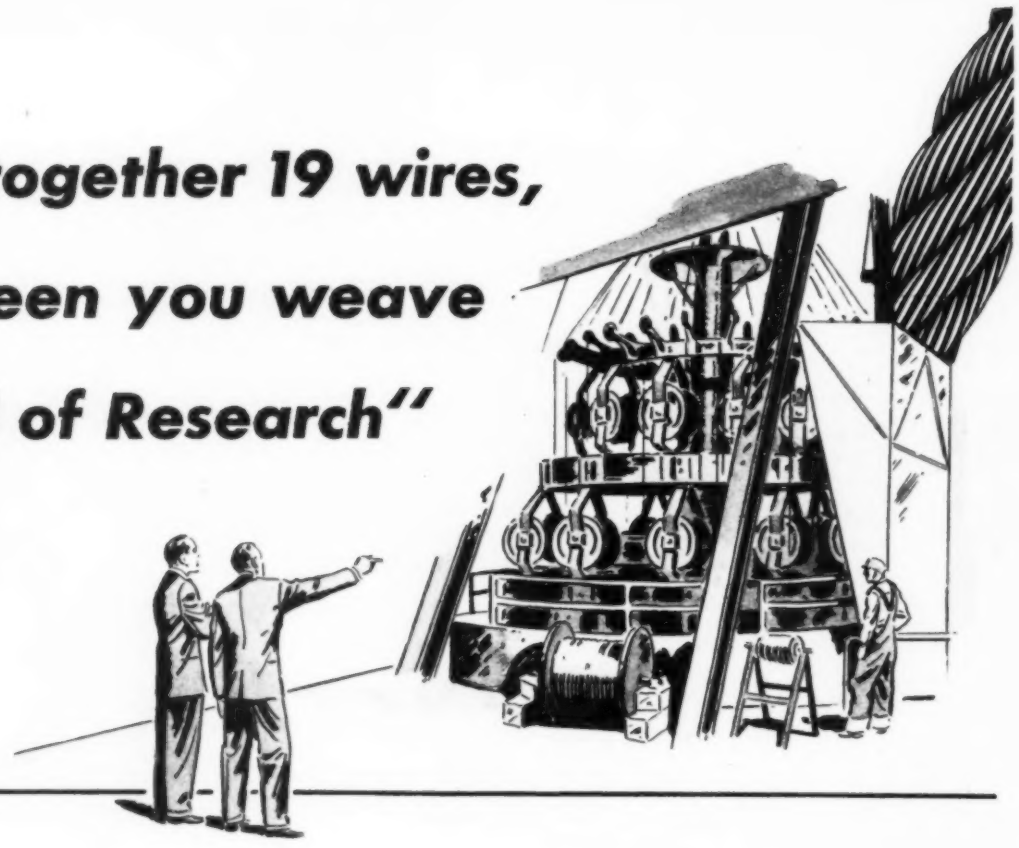
DEWALT PRODUCTS CORPORATION

LANCASTER, PENNSYLVANIA

DEALERS IN PRINCIPAL CITIES THROUGHOUT UNITED STATES

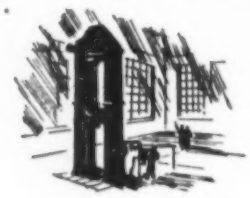
Canadian Representative: C. E. Disher, B. C. Mining Bldg., Vancouver, B. C.

"You strand together 19 wires, and in between you weave the thread of Research"



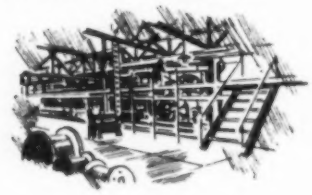
Like the research that's responsible for this giant strander

"Many a job calls for 6 x 19 "Blue Center" Steel Wire Rope, but for those that don't, Roebling Research is ready with specialized facilities and materials. This giant strander, for example, can take as many as 46 tough steel wires, and accurately lay them into strand for pliable, high-strength, large diameter ropes, such as are used on mammoth dredges . . .



How strong is such a strand? If we want to know, this "tower of torture" will tell us. Another of the long arms of Roebling Research, it can pull apart a 4" wire rope to find its ultimate breaking strength. It also indicates how the rope will behave under *your* conditions and *your* loads . . .

But of course you know that a study of wire rope quality must cover more than breaking strength alone. That is why Roebling Research created the world's largest, most highly developed fatigue testing machine for wire rope—a giant laboratory in itself. In its 75-foot length it simulates many conditions that "Blue Center" Steel Wire Rope meets in the field, lets Roebling Research men study each condition carefully . . .



Thus the strong but invisible thread of Research is woven into every inch of Roebling "Blue Center" Steel Wire Rope. Giving it the extra stamina to meet the unusual load as well as the routine one . . . to give extra service where extra service is called for. Bringing it to the high standards it must pass, to carry the Roebling Trademark . . ."

JR ROEBLING

Roebling Research, Roebling Engineering, Roebling Plant Facilities and broad Experience . . . each adds its part to the extra values in Roebling "Blue Center" Rope. Each helps it meet conditions unfailingly, wherever wire rope has a routine or unusual job to do.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

THAT'S THE ONLY WAY TO MAKE

ROEBLING

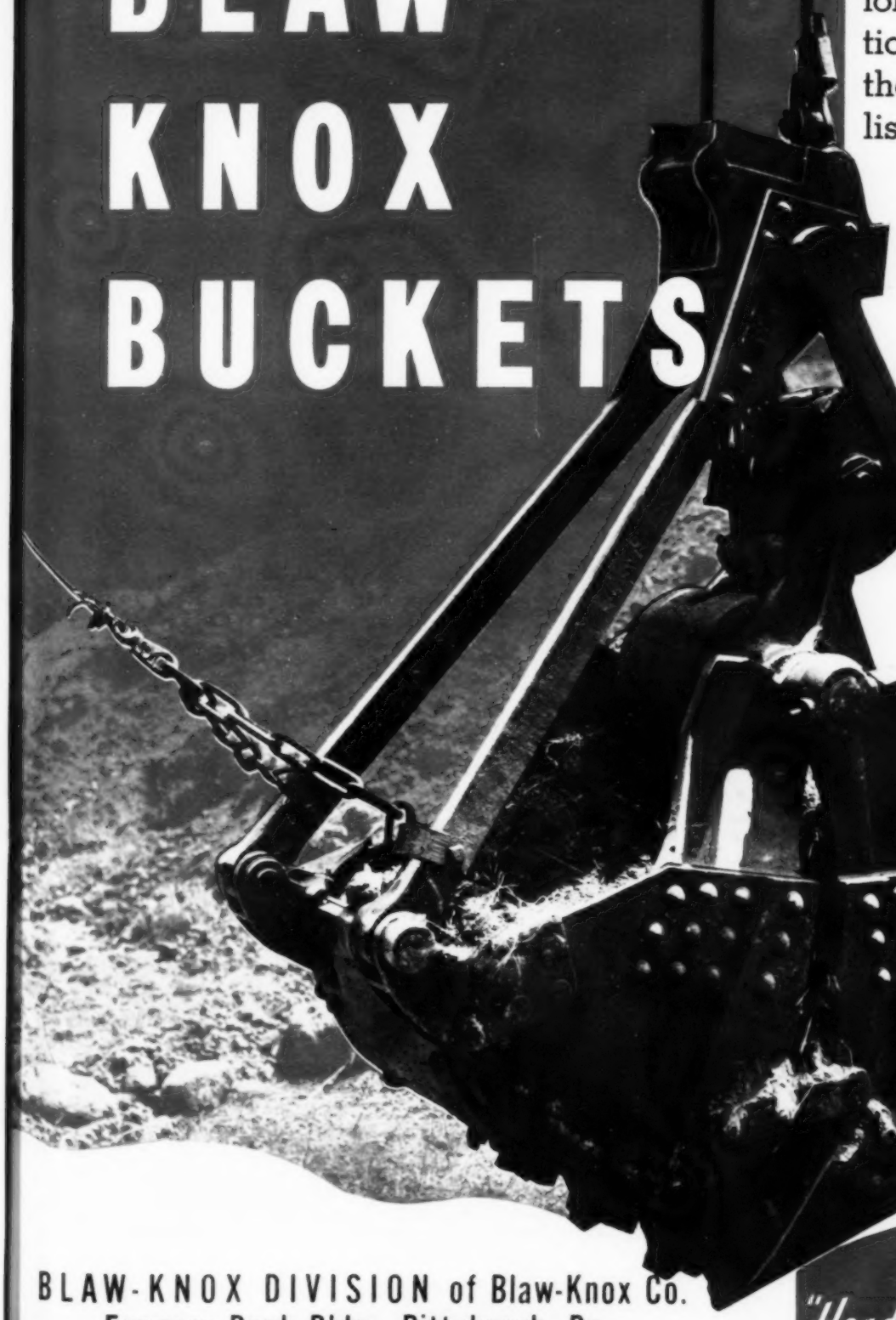
"Blue Center"

STEEL WIRE ROPE

PREFORMED OR NON-PREFORMED

When time counts

Depend on BLAW-KNOX BUCKETS



Speed up the job—with Blaw-Knox Clamshell Buckets—they handle more pay load with less dead weight. The rigid head maintains cable alignment and prevents wear—sealed ball bearing sheaves in the lever arm increase cable life, reduce friction and expensive replacements.

Blaw-Knox Buckets are available in a wide range of types and capacities for excavating, rehandling, dredging, steel mill service, etc. Send today for catalog with complete descriptions and detailed illustrations of just the right bucket for your job. See list below—

★ ★ ★

There's a Blaw-Knox Bucket for every purpose...

- DREDGING BUCKETS
- EXCAVATING BUCKETS
- REHANDLING BUCKETS
- ORE BUCKETS
- COAL BUCKETS
- OPEN HEARTH SLAG BUCKETS
- INCINERATOR BUCKETS
- FERTILIZER BUCKETS
- CEMENT PLANT BUCKETS
- FOUNDRY BUCKETS
- SEWAGE DISPOSAL BUCKETS
- CINDER AND ASH HANDLING BUCKETS
- PULPWOOD GRAPPLES
- SHIP'S TACKLE BUCKETS

BLAW-KNOX DIVISION of Blaw-Knox Co.
Farmers Bank Bldg., Pittsburgh, Pa.

"Headquarters for Clamshell Buckets"

HERE'S A DUAL PURPOSE MACHINE

for Finishing Concrete Slabs

ONE machine — the sturdy, job-proved Whiteman Finisher — will both FLOAT and FINISH heavy duty concrete slabs. Interchangeable trowels enable your men with the one operating unit to first: float even "hard to handle" heavy duty concrete and leave a perfect float finish — second: quickly change trowels and machine finish the floor to a dense, hard, level area free of voids or laitance, producing a job far superior to slow hand finishing.

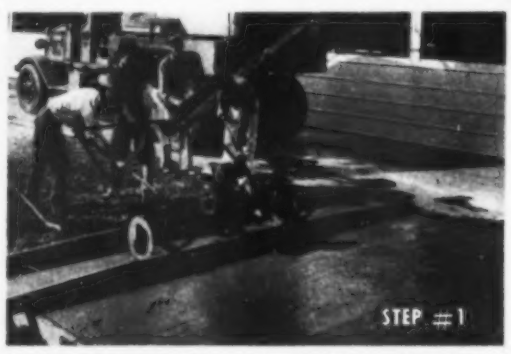
ONE machine with two sets of trowels does both your float and finish work.

To FLOAT
Your Heavy Duty Slabs

When you are ready to float your heavy duty concrete slabs, attach the "Heavi-Duti" FLOAT TROWELS (⅛" x 10" x 18") to your Whiteman Finisher. As your machine glides over the slab it produces a perfect float finish at high speed with the strong, broad trowels, which lay flat on the concrete. Whiteman machines with "Heavi-Duti" Float Trowels will cover 1,000 sq. ft. in as little as 15 minutes.

To FINISH
Your Heavy Duty Slabs

When you are ready to finish your concrete slabs, put the easily attached "FINISH" TROWELS on your Whiteman machine. These lighter, flexible and adjustable blades (17 gage steel 6" x 18") bring up the surface in a hurry — give you a harder, more dense floor that costs less to finish, wears longer.



WHITEMAN Portable Rodding Machine

screeds slabs faster, at lower cost. The power operated rod sticks (screeds) simultaneously level and condense even dry low slump concrete with ease — leaving a pour ready, when sufficiently set, for final finish by the WHITEMAN Finishing Machine.

Write TODAY for full information on money-saving WHITEMAN Portable Rodding Machine.

TWO Sets of Trowels – ONE Machine

These two sets of trowels ("Heavi-Duti" float type at left — "Finish" type at right) permit you to both FLOAT and FINISH heavy duty concrete slabs with a single machine. The Whiteman machine does both jobs quicker, producing a better floor at greatly reduced cost. Can you afford to miss these economies?

If you have a Whiteman Finisher with standard "Finish" trowels, the new "Heavi-Duti" Float Trowels are available at very low cost.

Write or wire your distributor or communicate direct with us.

WHITEMAN MANUFACTURING CO.
3249 CASITAS AVE.
LOS ANGELES, CALIFORNIA

P&H

your best hedge against *obsolescence*

Automotive hydraulic control speeds up digging.

Greater horsepower per yard of dipper insures steadier output.

True rolling crawlers mean better traction, easier maneuvering, lower maintenance.

Selective speed transmission gives you the desired change of pace for every operation in digging and travel.

Welded construction of rolled alloy steel insures years of profitable production.

Know your excavator values — check all of P&H's advanced features!

General Offices: 4494 West National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION

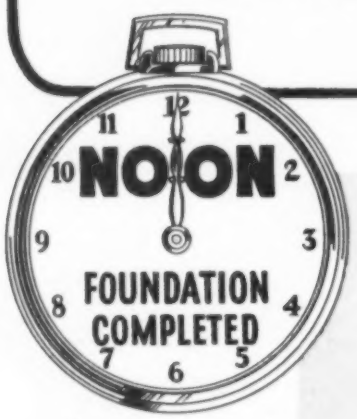
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

BE A STEP AHEAD WITH P&H

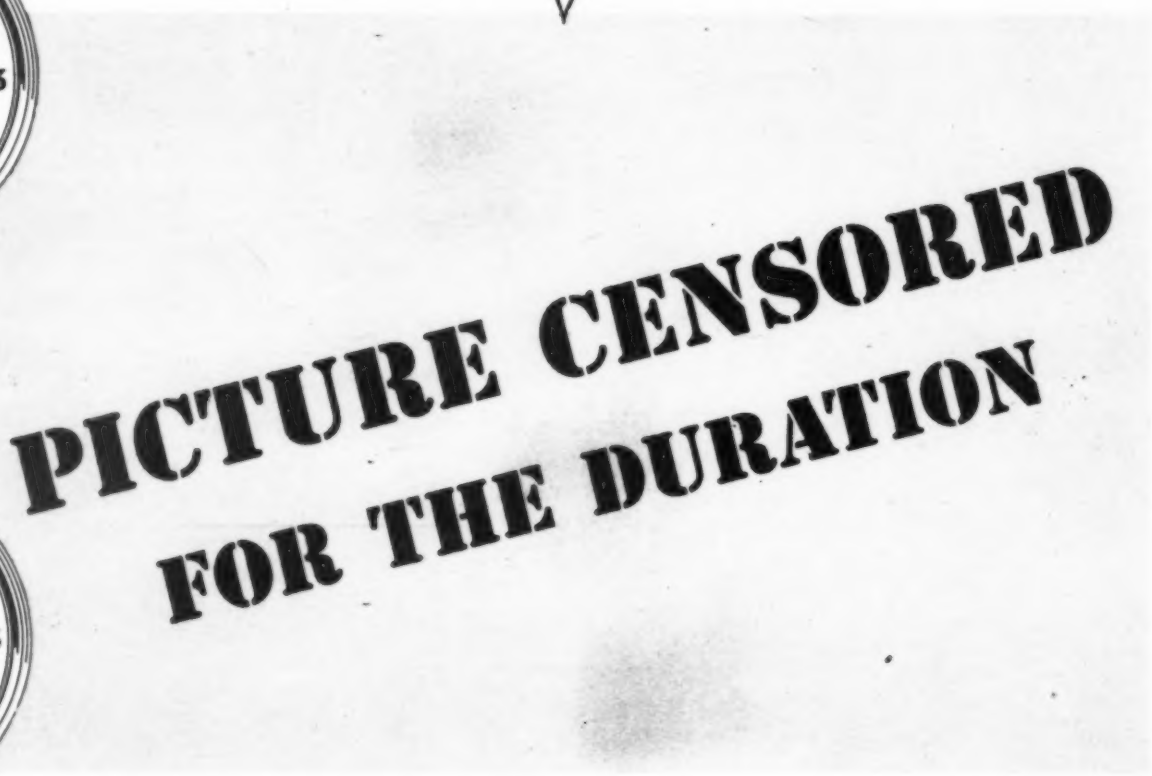
MORE *for your excavator dollar*

Ready for 4½-ton bomb-casing lathes

AFTER ONLY 19 HOURS!



TIME FOR CONCRETE CURING



Consider Atlas High-Early Cement for every **"RUSH"** *job!*

A STEEL PLANT (name and location deleted by censor) was being converted to manufacture 300- to 400-lb. bomb casings. Foundations for 4½-ton lathes had to be built quickly. The contractor reported that Atlas High-Early cement was used with the following result:

- **At 12:00 noon placement of the Atlas High-Early concrete foundation was completed.**
- **At 7:00 A. M. the following day—just 19 hours later—the 4½-ton lathes were in place on the foundations and were at work on bomb casings.**

The contractor advises that a stiff mix (1½" slump) of Atlas High-Early concrete was used. The aggregate was heated, and the concrete was carefully protected and cured.

Speed is the rule with Atlas High-Early cement—speed in building cantonments, defense housing, roads, airports—speed in building, converting, and repairing industrial plants—that's today's "must." And speed with economy is the reason why Atlas High-Early cement is being specified today. Specify it on your next job. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., N.Y.C.

OFFICES: *New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, Kansas City, St. Louis, Des Moines, Birmingham, Waco.*

CM-H-45

ATLAS HIGH-EARLY CEMENT

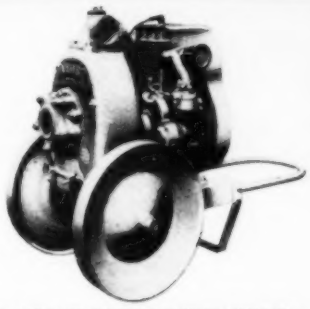
A UNIVERSAL ATLAS PRODUCT

In PUMPS, the BEST COSTS YOU the LEAST

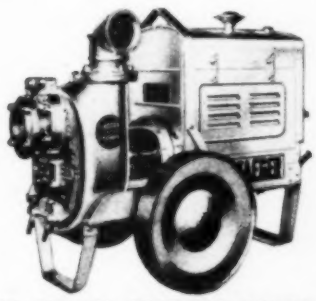
CERTIFIED HIGH PERFORMANCE

Every Jaeger Pump is Individually Tested and Guaranteed for Vacuum, Capacity and Pressure

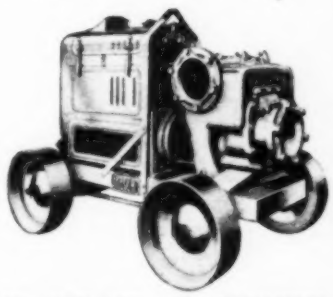
THOUSANDS of EXTRA HOURS of SERVICE for Your Future Protection as Well as Profit



2" AND 3" HEAVY DUTY PUMPS: Finest engineered small pumps — stand high pressures, continuous heavy service.



4" AND 6" PORTABLE PUMPS: Big capacity (up to 90,000 G.P.H.) and years of service in compact, easy handling units.

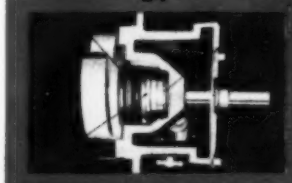


8" AND 10" BIG CAPACITY PUMPS: Huge air and water capacity (125,000 to over 200,000 G.P.H.), plus unequalled compactness and portability.

7 Reasons Why Jaegers Outlast and Outperform Other Pumps:

1. HIGH PRESSURE SHELL, of pat'd self-cleaning design.
2. REPLACEABLE LINERS.
3. PAT'D PRIMING JET, gives up to 5 times faster sure-priming.

4. HI-HEAD, HI-CAPACITY IMPELLERS (of steel in 4" to 8" sizes).
5. OVER-SIZE SHAFTS of heat-treated chrome nickel.
6. "LONG-LIFE" SEAL — accessible for inspection.



7. DIRECT DRIVE, ALWAYS IN ALIGNMENT — adds life to pump and engine.

JAEGER

"SURE-PRIME" PUMPS - - MIXERS - HOISTS

Manufactured by

THE JAEGER MACHINE COMPANY

800 DUBLIN AVENUE, COLUMBUS, OHIO

MECHANIZED PAVING GETS HIGH PRODUCTION GIVES LOW JOB COSTS

A NECESSITY with Dual-Drum Pavers, an ADVANTAGE with Pavers Big or Small: Jaeger's combination of Spreader with Finisher has eliminated the bottleneck and segregation of hand shoveling. Vital roads and airports are being paved as fast as contractors can pour with biggest dual drum or multiple pavers — mixes as dry as ½" slump, in all standard widths.

NO SEGREGATION with Jaeger Screw Spreader — Remixes and Can VIBRATE -Any Slump to ½", Any Standard Width to 25 Ft.

Only proven method that positively reworks and densifies concrete — improves slab texture — 25 used on Pennsylvania Turnpike. One man spreads and strikes off base and top, saves cost of crew.

LESS WORK TO DO Behind the Jaeger Type "H" Finisher — Flexible Control of Traction and Independent Screeds Increases Capacity and Smoothness

With complete range of effective speeds, "velvet touch" screeding and every function controlled by single direct movement of banked levers, Jaeger-Lakewood Standard or Vibratory Finishers achieve maximum production, cut final finishing costs.

Send for Complete Catalog and Data

THE JAEGER MACHINE COMPANY

800 Dublin Ave., Columbus, Ohio

Concrete-Bituminous Paving Equipment, Mixers, Pumps, Hoists, Towers, Truck Mixers

SMITH

Faster MIXING CYCLE.

IN FASTER

MIX FASTER

OUT FASTER

Speeds Up Big Concrete Projects!

Excelling in every phase of the batch cycle — *charging, mixing, discharging* — SMITH TILTERS are helping to complete big concrete projects in record breaking time. There are the three TVA projects, for example. Cherokee and Watts Bar Dams completed in 1941 — and Fort Louden Dam, *months ahead of schedule.*

The Smith automatic "straight-flow" feed chute shoots the materials directly to the center of the drum. Mixing is faster because the drum rotates in practically a horizontal position with converging blades producing a *real end-to-center mixing action.* The big drum opening and steep 60° drum tilt assures faster discharge.

If you're looking for the fastest, most modern concrete mixers, be sure to investigate SMITH TILTERS. All sizes available, up to 4-yards per batch. Write for catalog.

The T. L. SMITH CO., 2851 N. 32nd St., Milwaukee, Wis., U.S.A.

New, improved Smith Tilter with all-welded box girder pedestals and tilting frame . . . Machine cut, heat-treated, high-carbon steel gears . . . Forged, heat-treated drum rollers . . . Fully enclosed transmission unit . . . Direct connected motor . . . etc.

SMITH TILTERS

at "HOME on the Range"

OUT on jobs hundreds of miles from anywhere, you'll find Buckeye trouble-free cable controlled 'Dozers stepping through their paces day after day without a whimper. They're built to take the toughest jobs through without being babied. They're "at home on the range" or *anyplace* else you *put them to work*—ready to move big yardages in record time. Check Buckeye features first. You'll find advantages not found in any similar tractor equipment.

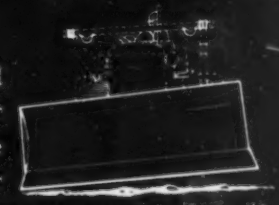
BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio

NEW BUCKEYE UNITILT DESIGN!

IT'S TWO IN ONE!

Bulldozer or Trailbuilder on a universal frame! Just change the blades. Frame also accommodates Unitilt push pads.

IT TILTS!

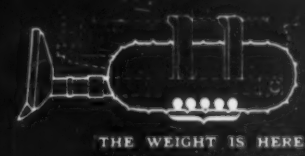


Bulldozer as well as Trailbuilder tilts! You can use the Bulldozer moldboard for many types of trail-builder work!

IT ROLLS THE DIRT!

Blade curvature is such that blade digs its own way in and *rolls* dirt ahead for bigger payloads with the same power.

IT "HUGS" THE RADIATOR!



THE WEIGHT IS HERE

Blade hangs close to radiator. Keeps tractor in balance with weight on *all* track rollers.

AND MANY OTHER ADVANTAGES!

Built by Buckeye

Convertible Shovels

Trenchers

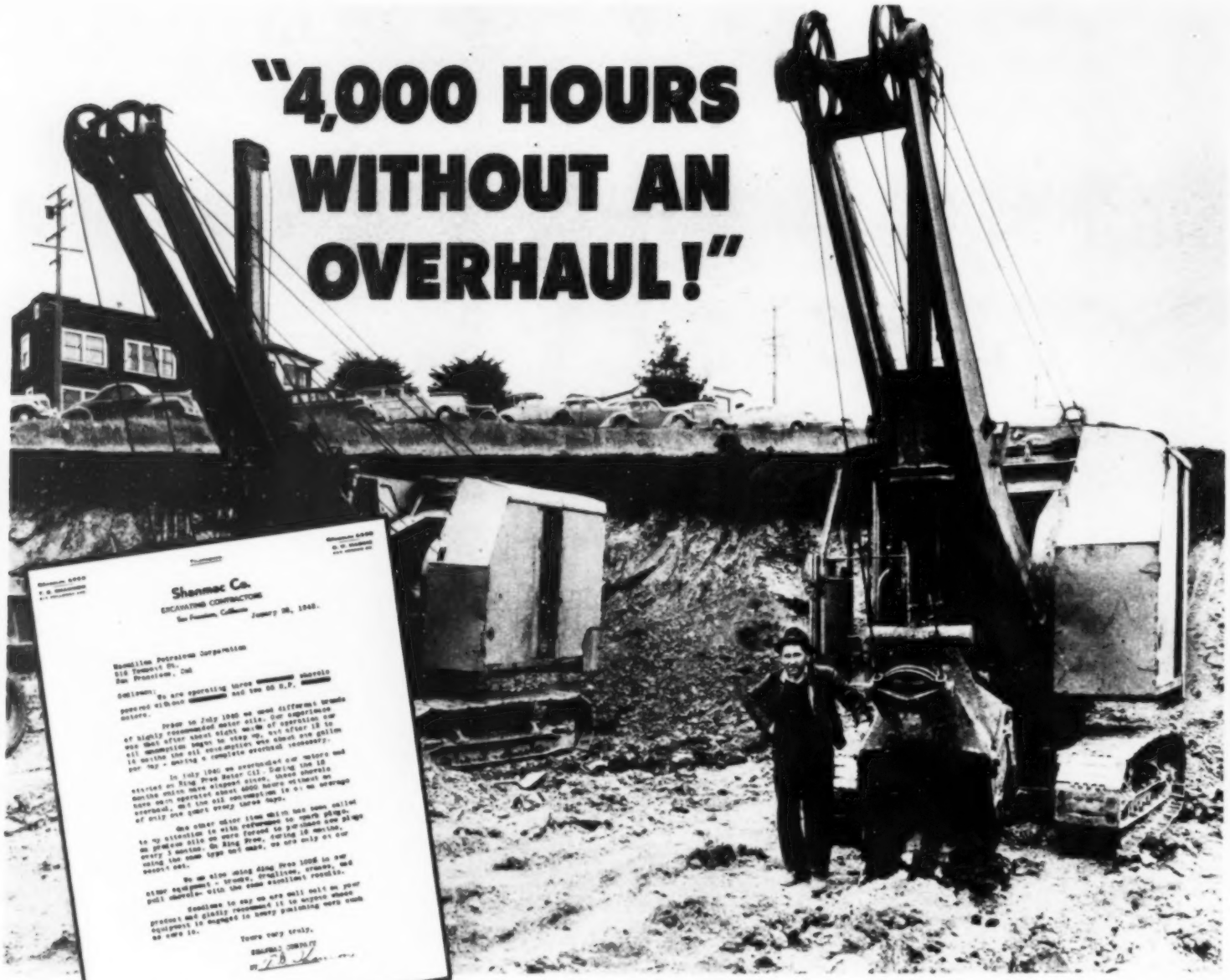
Tractor Equipment

R-B Finegraders

Road Wideners

Spreaders

"4,000 HOURS WITHOUT AN OVERHAUL!"



Shanmac Co.
EXCAVATING CONTRACTORS
San Francisco, California January 28, 1942.

Macmillan Petroleum Corporation
618 Tennant St.
San Francisco, Cal.

Gentlemen:

We are operating three [redacted] shovels powered with our [redacted] and two 60 H.P. [redacted] motors.

Prior to July 1940 we used different brands of highly recommended motor oils. Our experience was that after about eight months of operation our oil [redacted] began to step up, and after 12 to 14 months the oil consumption was about a gallon a day - making a complete overhaul necessary.

In July 1940 we overhauled our motors and started on Ring Free Motor Oil. During the 18 months which have elapsed since, our shovels have each operated about 4,000 hours without an overhaul, and the oil consumption is on an average of only one quart every three days.

On other oils we had to purchase new spark plugs every three months. On Ring Free, they are on only their second set after 18 months.

We are using Ring Free 100% in our other equipment - trucks, draglines, cranes, and pull shovels with the same excellent results. Needless to say we are well sold on your product and gladly recommend it to anyone whose equipment is engaged in heavy, punishing work.

Yours very truly,

[redacted]

THE EXPERIENCE of the Shanmac Company, excavating contractors of San Francisco was that prior to July 1940 they used different brands of recommended motor oils.

But after about eight months of operation, their oil consumption began to step up. And after 12 to 14 months the oil consumption was about a gallon a day—making a complete overhaul necessary.

"In July 1940 we overhauled our motors and started on **RING-FREE** Motor Oil," writes T. G. Shannon.

"During the 18 months which have elapsed since, our shovels have each operated about 4,000 hours without an overhaul, and the oil consumption is on an average of only one quart every three days."

On other oils they had to purchase new spark plugs every three months. On **RING-FREE**, they are on only their second set after 18 months.

"We are using **RING-FREE** 100% in our other equipment—trucks, draglines, cranes, and pull shovels with the same excellent results. Needless to say we are well sold on your product and gladly recommend it to anyone whose equipment is engaged in heavy, punishing work."

RING-FREE is the only oil you need, as Mr. Shannon points out, for all the different kinds of equipment used by contractors.

What **RING-FREE** has done for others, it can do for you. Write us!

* * *

MACMILLAN PETROLEUM CORPORATION
50 West 50th Street, New York · 624 So. Michigan Avenue, Chicago · 530 West 6th Street, Los Angeles

MACMILLAN
RING-FREE
MOTOR OIL

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Macmillan Petroleum Corporation

AMERICA'S OWN KIND OF WAR

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Our country didn't ask for this war. It was thrust upon us by a treacherous enemy. But of all the wars in world history, this one comes nearest to being made to our measure.

The whole life and training of generations of Americans fit us to excel in mechanized warfare. From pioneer days we have been an ingenious people. Starting in a vast, undeveloped country, we have had the inventive skill and the resolution to shorten distances and lighten toil with machines.

We have built more railroads, more motor cars, trucks and tractors than any other nation on earth. We have built machines to turn the resources of mines, forests, oil fields and farms into productive wealth. And among the millions of Americans now of military age, there is scarcely a man who has not grown up familiar with the handling of machinery.

We have the horsepower and the man-power. We know how to use machines and we know how to produce them. There is only one thing that can lose this war for us, and that is complacency—half-hearted effort—failure to face the shocking possibility of defeat.

To win we have got to put *all* our energy and *all* our will into the one big job before us.

There is no complacency among "Caterpillar" men and management. Every worker in the plant knows why America needs the machines he builds, and he builds them with all he's got.

"Caterpillar" Diesel Tractors, Graders, Engines and Electric Sets are giving valiant service today on every fighting front. They are saving men, and the time and labor of men; breaking jungle trails, building and repairing landing fields, hauling big guns, powering winches, generating current for search-lights and telephones, clearing beach-heads, supplying main or stand-by power for Navy and Coast Guard craft.

Without redesigning or lost motion, the whole productive effort of this company has now been given a single aim—to put Diesel power in the hands of our Armed Forces and our Allies. And "Caterpillar" dealers everywhere are devoting their service facilities to keeping the machines in fighting trim for the all-out war job.

In this battle for our rights and freedoms, there is no room for bystanders. All of us are fighters now. And it's *our kind of fighting!*

CATERPILLAR TRACTOR CO.

PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY DEFENSE BONDS!

3 ways to make your Wire Rope dollar go farther...conserve steel tonnage too

(No. 9 in a series of informative articles for wire rope users prepared by the Macwhyte Wire Rope Company. Previous articles in this series are available on request on your company letterhead.)

1 Buy PREformed; it's best, costs less

There have always been sound reasons for buying PREformed wire rope. Careful tests time and again have proved it gives better service than non-preformed, costs less in the long run, saves time because fewer shutdowns are necessary for replacements.

Fig. A — PREformed ropes are free of internal stress, have high fatigue resistance.

Today there's another reason why it's most important to buy PREformed: by doing so you help national defense.

It takes just as long at the steel mill to make steel for non-preformed as for PREformed wire rope. Yet PREformed will outlast ordinary wire rope on most jobs. When you buy Macwhyte PREformed, therefore, you're helping conserve not only steel which America greatly needs, but also the time of those who make it.

2 Install Rope Carefully

It's so easy to kink or twist rope when installing in a hurry. Such "haste makes waste." Kinking and twisting definitely shortens rope life.

With reasonable care and speed you can prevent both. Here are some simple suggestions on unreeling and uncoiling rope . . . operations where both kinking and twisting are apt to occur.

CORRECT WAY

Unreeling—The reel should be revolved and the rope taken off the way it is put on the reel. Illustration No. 1 shows one method—put a shaft through the center of the reel and jack it up so that the reel will revolve freely. Pull the rope straight ahead, keeping it taut to prevent it from loosening up on the reel. A board held against one flange may be used as a brake to keep the reel from revolving too fast.

Uncoiling—Roll the coil along the ground so the rope lies straight as shown in Illustration No. 2. There will be no twist or kink in the rope if these instructions are followed.

INCORRECT WAY

Illustrations 3 and 4 show incorrect ways of unreeling and uncoiling. Notice that the reel and coil cannot revolve and therefore the rope is twisted as each turn is taken off.

3 Inspect Your Ropes Regularly

Once wire rope is on their equipment many users overlook the value of regular inspection. Such negligence is costly. It can be avoided by regular inspection which takes far less time, is much less expensive than too frequent buying and replacing for lack of knowledge of their condition.

Pictured here are a few of the most common "Wire rope enemies" which, if *not* eliminated or kept under control, can easily reduce the service life of your rope as much as 50%. Also given here are suggested methods of avoiding these dangers.

Fig. B—Reverse bends—Years of experience and many tests have proved that reverse bending and excessive wire fatigue reduce rope life as much as 50%.

Where reverse bending cannot be eliminated, use the largest sheaves possible and place them as far apart as possible. By getting the MAXIMUM distance between reverse bends, you reduce fatigue—provide longer service.

Fig. C—Sheaves too small. This rope was forced to travel continuously over sheaves whose diameters were too small. Frequent inspection would have shown this danger. A change to a larger sheave would have solved the problem. (Note: PREformed wire rope would have lasted much longer in this case.)

Fig. D—Drum abrasion and abuse caused this. The rope was scuffed over and over against previous wraps on a flat-faced drum. This could have been prevented by even winding and grooved drums.

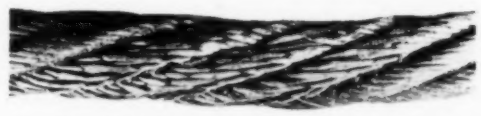


Fig. E—Kinking caused this. This dog-leg, or kink, was finally straightened out . . . but notice the uneven wear at the point where the kink had been. Proper handling during installation could have prevented this. Beware of dog-legs! They're expensive.

Why Guess? When you can KNOW!

Macwhyte Company wants you to know that they will be glad to offer recommendations of the correct ropes for your equipment and, if you like, discuss with you possibilities of getting more from the ropes you are using . . . should there be any doubt in your mind as to whether you are getting the best service.

NO. 589

MONARCH
Whyte Strand
PRE-FORMED
. . . the CORRECT rope for your equipment

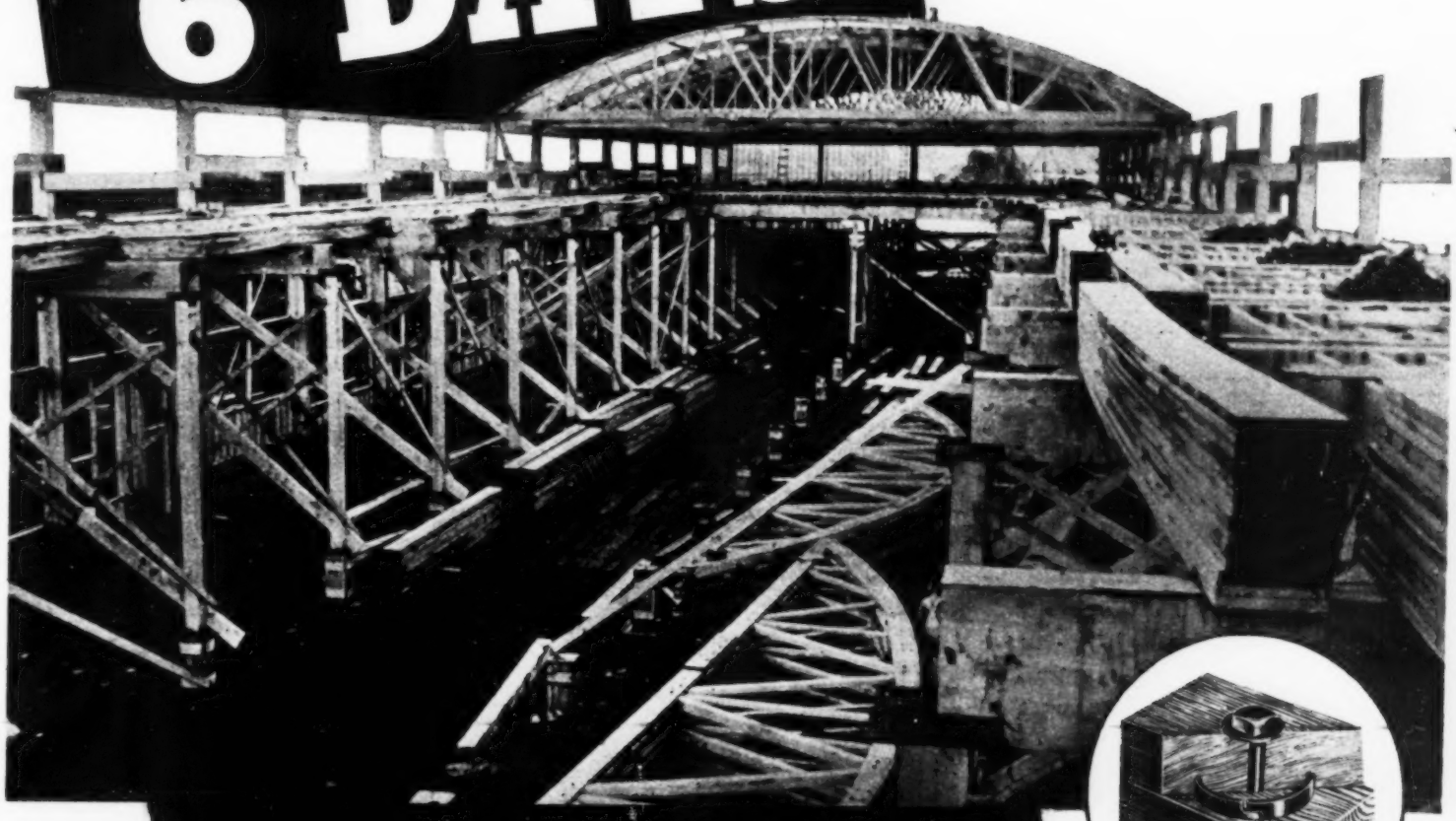
Internally Lubricated—made with 2 kinds of wire—Laboratory Tested —Field Proved

MACWHYTE COMPANY
2941 Fourteenth Avenue · Kenosha, Wis.

Manufacturers of Wire Rope to meet every need—left-&-right-lay braided slings—stainless steel wire rope—monel metal wire rope—aircraft cable, aircraft tie-rods, and "Safe-Lock" cable terminals.

New York · Pittsburgh · Chicago · Fort Worth
Portland · Seattle · San Francisco
Distributors throughout the U. S. A.

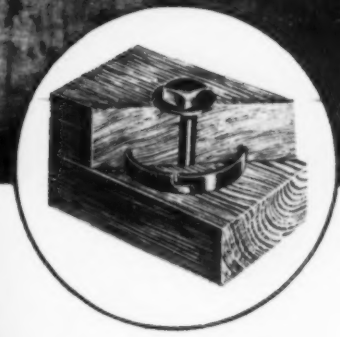
DELIVERED IN 6 DAYS



The 21 timber roof trusses—80' span—used in this mold loft at the Willamette Iron & Steel Corporation shipyard were framed, assembled and delivered ready-to-erect in 6 working days after final lumber delivery.

Speedy and efficient construction of buildings ranging from small storage sheds to giant mold lofts, like this, is assured through use of the TECO Connector System of Timber Construction and a new engineering service offered to users of wood.

For complete information on how the TECO System can help solve your emergency building problems, fill in and mail the coupon.



The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood.

Timber Engineering Company, Inc.

DEPT. M-4 1337 CONNECTICUT AVENUE

WASHINGTON, D. C.

Please send us complete information on the TECO Connector System of Timber Construction.

INDIVIDUAL .....

FIRM .....

STREET ..... CITY ..... STATE .....

It's development–or envelopment

I thought this field trip was to preview tomorrow's world *of welding—but look what's happening* today.

ALTER EGO: It may be tomorrow to you but I'm afraid it's yesterday to these people. Here they've completely shield-arc welded a building in the shop—toted it to location on a shield-arc welded truck-trailer—dropped it to the foundation with a shield-arc welded tractor crane.

And here I am worrying about whether it's time for us to consider arc welding for some of our simpler designs.

ALTER EGO: Well, this company started with welding. Found it worked, developed a stride. Now they're leaders in their field—largely because they use welded construction 100%.

And, as they say, "The result is a lighter, stronger product—be it machine, building, ship or what have you—a design that can be more easily and quickly changed for improvements." *No wonder they've kept their products away from any enveloping movement. Their flanks won't be blitzed in the Battle for Business a few years hence. So much for them—but how about* us—*how can we get similar results for our products?*

ALTER EGO: Wouldn't it be well for us to ask The Lincoln Electric Company, Cleveland, Ohio, for their Structural Design Studies to get practical pointers on change-over to welding?

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

HEIL HI-SPEED TRACTOR SCOOP gives you faster dirtmoving at lowest cost per yard

Heil Hi-Speed Tractor Scoop. 15-Yard Heil Scoop pulled by 150 H.P. Heil Rubber Tired Diesel Tractor.

Heil Hydraulic Trailbuilders and Bulldozers. Built in sizes for all Cletrac Tractor Models.

Speed up operations — Move bigger yardage, faster and cheaper — with Heil Hi-Speed Tractor Scoops.

For faster dirtmoving and bigger yardage on long haul jobs, investigate the extra economies and profitable capacity of Heil Hi-Speed Tractor Scoops. These 15 Yard Units are quickly push-loaded in 40 to 50 seconds — they haul at travel speeds up to 20 M.P.H., depending on road and grade conditions — and they spread their loads quickly with a positive mechanical pushout action secured by tilting the floor of the bowl.

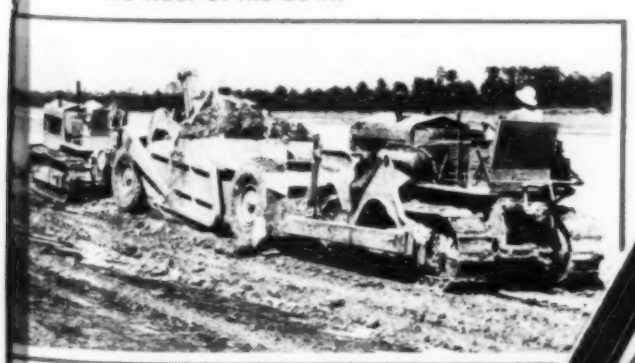
Quick acceleration and higher travel speeds insure faster operation — and allow users of Heil Hi-Speed Units to show a profit on jobs where slower earthmoving operations would not be practical. Consult the chart below and compare Heil Hi-Speed yardages with those you are now moving with conventional equipment. With a 100 H.P. Crawler Tractor push-loading, you can expect to move the following "Pay Dirt Per Hour."

One-way Haul	ROAD CONDITIONS * 100%	80%	60%
600 Feet	300 Cu. Yd.	240 Cu. Yd.	180 Cu. Yd.
1000 Feet	270 Cu. Yd.	216 Cu. Yd.	162 Cu. Yd.
1500 Feet	225 Cu. Yd.	180 Cu. Yd.	135 Cu. Yd.
2000 Feet	180 Cu. Yd.	144 Cu. Yd.	108 Cu. Yd.
3000 Feet	138 Cu. Yd.	110 Cu. Yd.	83 Cu. Yd.
4000 Feet	108 Cu. Yd.	86 Cu. Yd.	65 Cu. Yd.
5000 Feet	95 Cu. Yd.	76 Cu. Yd.	57 Cu. Yd.

*** EXPLANATION OF ROAD CONDITIONS**

100% — Good Haul Road — High Gear Output.
80% — Fair to Good Haul Road — Some 3rd & 4th Gear Speed.
60% — Fair Haul Road — 2nd & 3rd Gear Loaded — 3rd & 4th Gear Return.

Above figures based on 12.5 Cu. Yd. "Payload" — 50 Second Loading Time, and 35 Second Dumping and Turning Time.



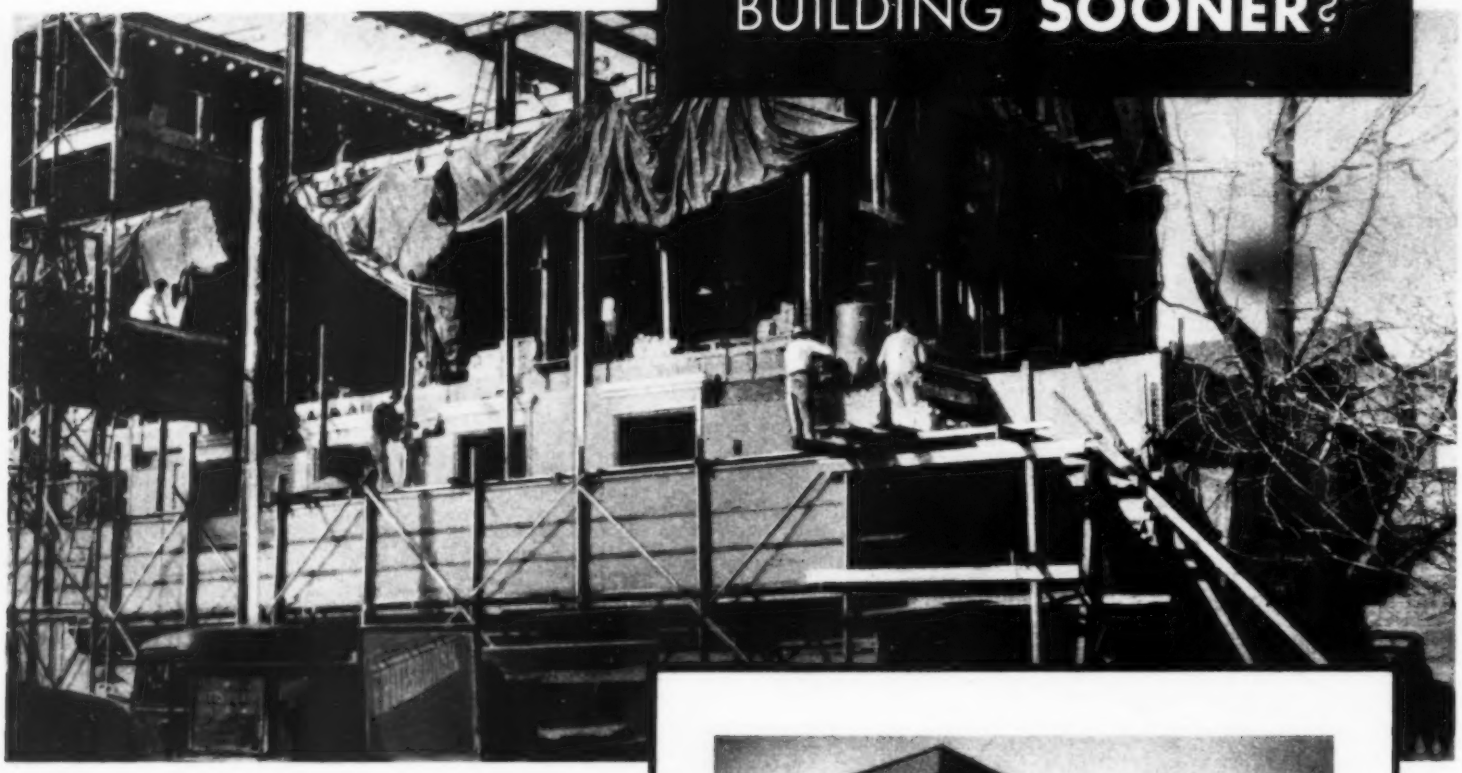
Heil Twin-Cable Scoops. 6 to 25 Yd. capacities for use with any make of Crawler Tractor.

Heil Hydraulic Dump Units. Available in sizes and capacities for mounting on any make of truck.

THE HEIL CO.

GENERAL OFFICES: MILWAUKEE, WISCONSIN

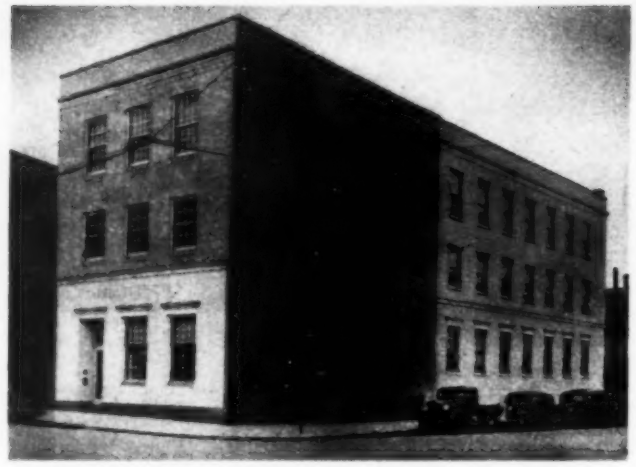
"CAN'T WE HAVE OUR BUILDING **SOONER**?"



More cold weather work, less cold weather risk . . . with Lehigh Early Strength Cement.

Today, more than ever before, you run into this request. Ritter Brothers did, in erecting the new Bell Telephone building at Lebanon, Pa., neighbor to a fast-growing army camp.

So the concrete pouring was advanced from spring to winter; and Lehigh Early Strength Cement was sent in to "bat" in place of Normal. The result was quicker stripping of forms . . . earlier access of other trades to their part of the work . . . and at least 15 days' earlier completion of the building. Ritter Brothers call Lehigh Early Strength Cement a principal method of expediting construction work.



TELEPHONE EXCHANGE, Lebanon, Pa.
OWNER: Bell Telephone Co. of Penna.
ARCHITECT: James W. Minick, Harrisburg, Pa.
CONTRACTOR: Ritter Brothers, Harrisburg, Pa.

You know why, of course. This cement produces service-strength concrete 3 to 5 times faster than normal cement. This time of year—when you don't know whether it's going to freeze or thaw—the use of Lehigh Early Strength Cement reduces not only the danger of frost damage but the cost of heat protection.

Ask the Lehigh Service Department to tell you of other advantages that help to explain the increasing use of Lehigh's quick-action cement.

Lehigh EARLY STRENGTH CEMENT

for **service-strength** concrete in a **hurry**

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

. . . AND HERE ARE 8 OF THE REASONS YOU CAN COUNT ON BIG OUTPUT WITH BUCYRUS-ERIE DIPPERS:

1. Struck capacity rating means full pay loads delivered each pass;
2. Inserted teeth and cutting lip are angled for easy penetration, and consequent fast filling;
3. Flared body and curved door shed loads fast;
4. Braces permit easy adjustment to best digging angle for varying materials;
5. Hoist attached well back leaves top clear to handle oversize;
6. Widespread handle attachments hold dipper firmly into the digging;
7. Protruding lip cuts clearance for dipper body, increasing filling speed, reducing wear;
8. Cross-sectional shape conforms to flow and pack of material, reducing voids, increasing pay load.

When you have a shovel job that demands big output fast, find out the full story on Bucyrus-Erie dippers.

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

When Compressor Valves Sing...

. . . it's a certain sign that they are getting too little oil, and are liable to pit and rust. "Upon inspection, valve surfaces should have a greasy appearance," say compressor builders.

Too much oil is equally bad, carbonizing, restricting air passages, preventing proper operation.

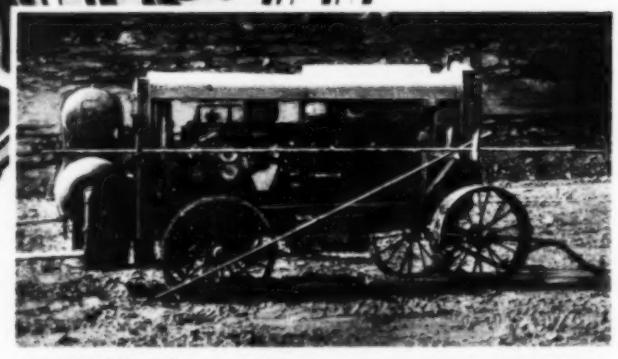
For continued top-performance of your compressors, lubricate with *Texaco Alcaid, Algol, or Ursa Oils.*

These oils resist gumming, sludging, carbonizing. Their use assures efficient valves, free rings, open ports and air lines.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.



Ingersoll-Rand Portable Compressor on excavation job. Machines such as this are maintained at high efficiency with minimum of attention when lubricated with Texaco.

THEY PREFER TEXACO

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

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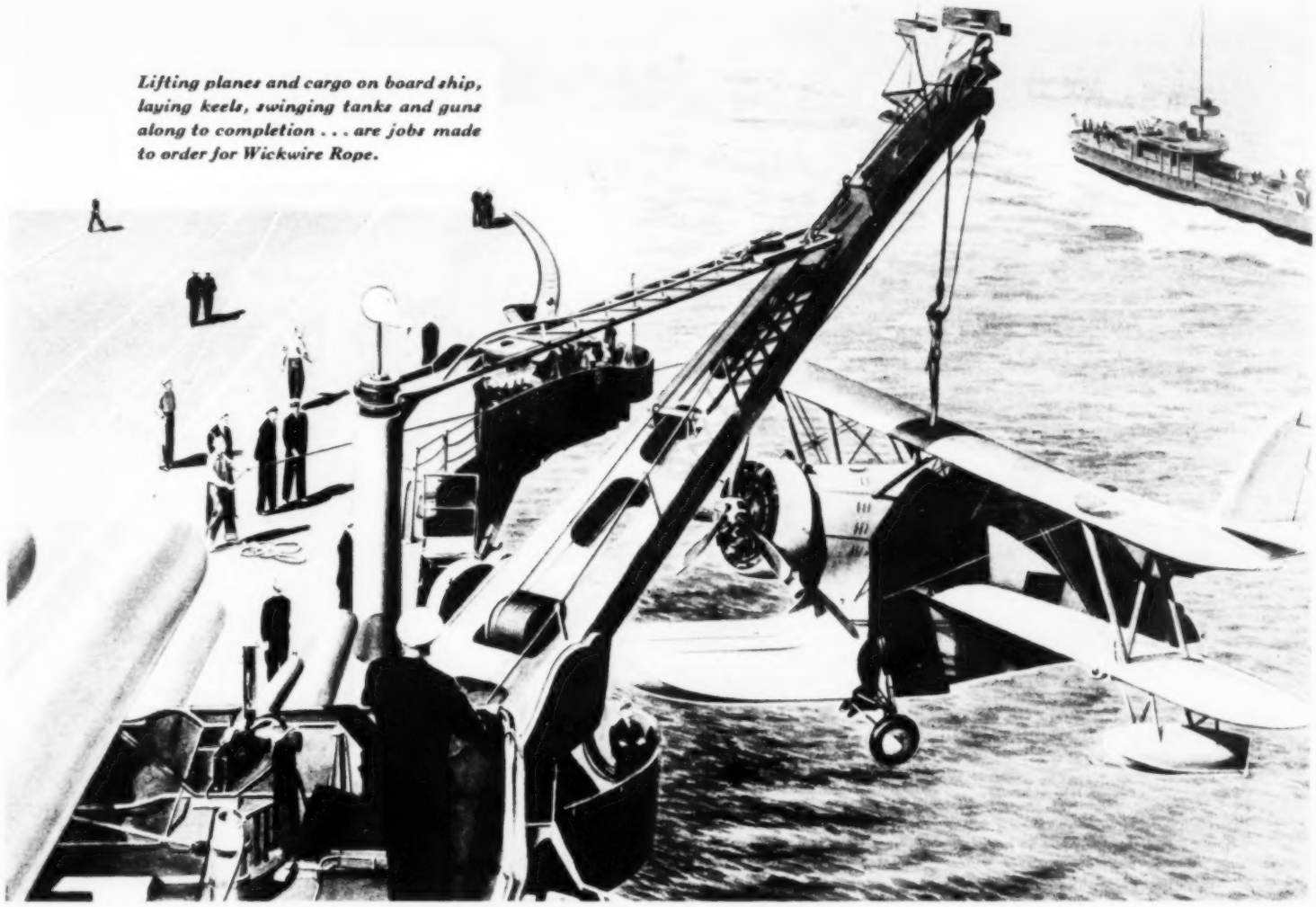
FOR YOUR ENJOYMENT
FRED ALLEN every Sunday night. See your local newspaper for time and station.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY



Lifting planes and cargo on board ship, laying keels, swinging tanks and guns along to completion . . . are jobs made to order for Wickwire Rope.

BRINGING WARBIRDS HOME TO ROOST

Another Job for Wickwire Rope

It takes a lot of "heavy work" to win this war—and where the hoisting, hauling and pulling are toughest, there you'll find Wickwire Rope on the job.

The vital need for this vital steel tool of heavy industry points up a message to all users of Wire Rope.

Make your Wire Rope *last longer* . . . save steel too . . . by taking proper care of Wire Rope on the job.

And when you need Wire Rope, depend on Wickwire regular lay or pre-formed Wissco lay. Let our field men figure your exact needs, and show you how to get the most for the least. Then, after the Wickwire Rope is on the job, our field representative will also consult with you on ways to get most efficient performance.

The uniformity and long-life of Wickwire Rope is assured by our manufacturing methods, which control every step from ore pile, to blast furnace, to open hearth, to finished rope.

• • •

To make wire rope last longer, it's important to consult our authoritative manual "KNOW YOUR ROPES." More than 25,000 users all over the world consider it a bible on the selection, application and handling of wire rope. Write for free copy to: Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N.Y.

THE LOWLY OIL CAN will pay dividends in making wire rope last longer. Internal wear can only be minimized by proper lubrication. Without it, there is excessive friction, binding and grooving which result in premature failure. This and forty more rope life-savers are fully described in our free booklet "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

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Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

BEST WAY TO MAKE YOUR TIRE CERTIFICATES "PAY OFF"

For Rock Work

GOODYEAR HARD ROCK LUG

Tough, massive, close-spaced lugs protect the carcass from cutting; provide equal driving power forward or backward; do not hold rock.

For Mud and Marsh

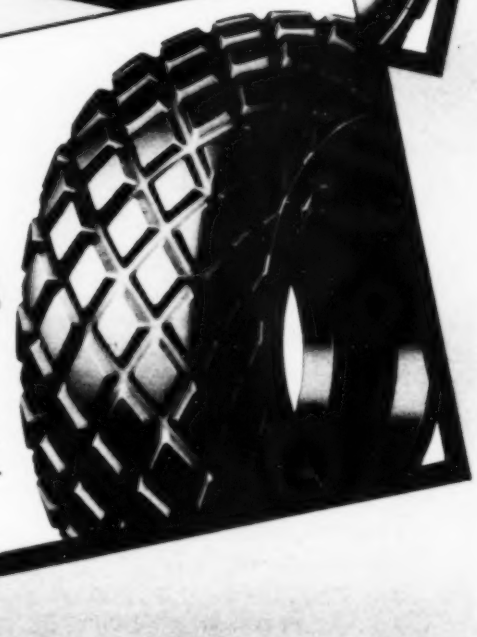
GOODYEAR SURE-GRIP GRADER

Traction provided by deep, wide and evenly-spaced driving bars; a self-cleaning, open tread.

For Sand and Soft Dirt

GOODYEAR EARTH MOVER

Deep, wide-spaced All-Weather tread provides equal driving power forward or backward; prevents sideslip on grades.



***Now*—THE GOODYEAR TIRE ENGINEERING SERVICE KEEPS YOUR TIRES GOING LONGER**

Your Goodyear dealer is now equipped to give you expert engineering help to prolong casing life. This special service keeps little injuries from growing into gaping wounds, keeps tires in tip-top shape—makes them last longer. It insures best performance from new tires. See about it today.

GET YOUR RETREADING DONE RIGHT

All Goodyear dealers can arrange for retreading any make of off-the-road tire, up to the largest size—in the correct mold to assure a first-class job.

NATURALLY, you want to be sure the tires you buy today are the hardiest, longest-wearing you can get—you know how long they may have to last!

When it comes to tire performance, you can go by the word of big contractors. For more than twenty years they've hauled more tons on Goodyear truck tires than on any other kind—*because their records show Goodyears cost less per mile, per hour or per yard.*

So pick the type of Goodyear that fits your job, and see your dealer about it today!

No matter what kind of tires you have been using, now's the time to change to Goodyears.

GOODYEAR

All-Weather—
T. M. The Goodyear Tire & Rubber Company

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

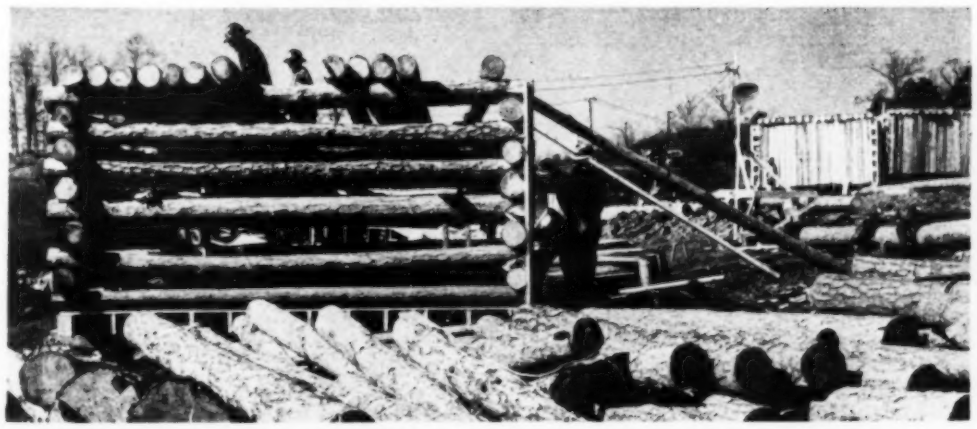
Construction Methods

ROBERT K. TOMLIN, Editor

Volume 24 | APRIL, 1942 | Number 4

WOOD DORMITORIES, erected originally to house TVA construction workers on recently completed Cherokee Dam a few miles away, are dismantled, moved and re-erected at Douglas Dam site.

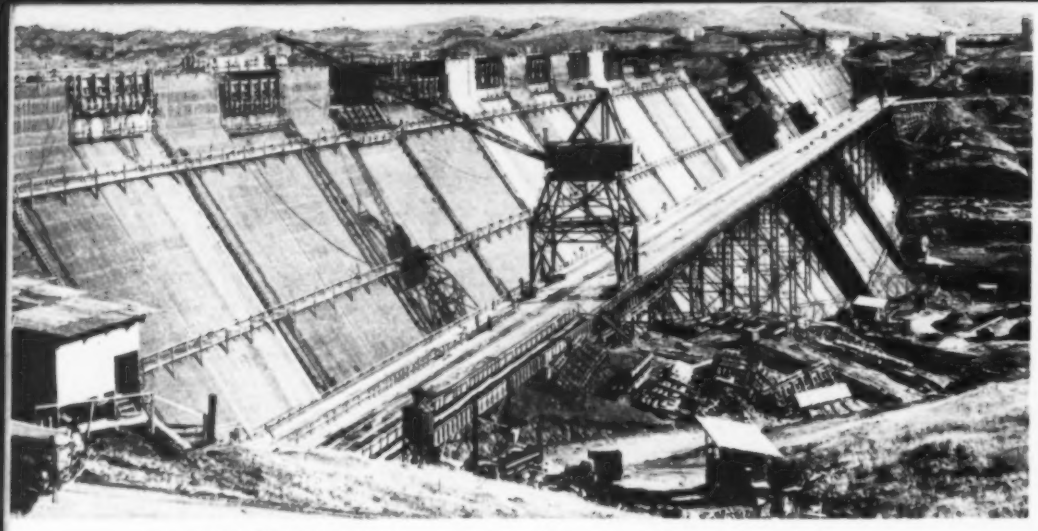
TVA STARTS $30,000,000 *Douglas Dam*



BLAST HOUSES, to protect workers from flying debris during excavation of rock for dam foundation, are built of logs cut from adjacent hillsides. Logs obtained from local sources will also be employed in connection with construction of cofferdam.

CONSTRUCTION HAS BEEN STARTED on Douglas Dam, $30,000,000 power and flood control project of the Tennessee Valley Authority on the French Broad River in Eastern Tennessee. Ninth of a series of similar TVA projects to provide electric power for war production purposes, Douglas Dam will be a concrete structure, similar in a general way to Cherokee Dam, with a height of 150 ft. and a length of 760 ft. When work gets into its full stride it is expected that the building of Douglas Dam will call for the employment of about 5,000 men. The completed project is designed to produce 100,000 kw. of power for manufacture of aluminum and other war ma-

(Continued on page 120)



THIS MONTH'S NEWS REEL

FRIANT DAM, fourth largest concrete dam in world, nears completion as Griffith Co. and Bent Co., contractors, Los Angeles, place final lifts of 2,150,000-cu.yd. mass which already has backed water more than 6½ mi. up San Joaquin River. U. S. Bureau of Reclamation is building structure, which has crest length of 3,430 ft. and maximum height of 320 ft. above bedrock, as unit of Central Valley project, Calif.

British Combine Photo.

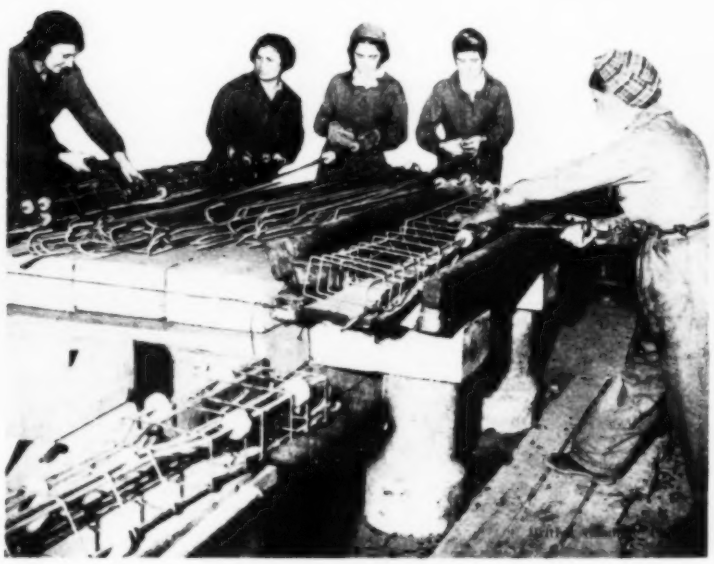
AUSTRALIAN DEFENSES expand rapidly at Port Darwin, north coast base, in preparation for Japanese attacks as Australian army builds concrete gun emplacements, machine gun posts, roads and barb wire entanglements in temperatures exceeding 100 deg. and humidity above 70 percent.

"INFORMATION PLEASE" at question-and-answer session during annual convention of American Road Builders Association at Memphis, Tenn., in March brings together this group of experts: (left to right) C. N. CONNER, senior design highway engineer, Public Roads Administration; A. D. MORRELL, national director, Public Work Reserve, FWA; PERRY A. FELLOWS, chief engineer, Work Projects Administration; LAWRENCE S. TUTTLE, senior highway engineer Public Roads Administration; COL. JOHN W. WHEELER, 113th Engineers, U. S. Army, Camp Shelby, Miss., and WILLARD CHEVALIER, publisher "Business Week," McGraw-Hill Publishing Co., presiding.

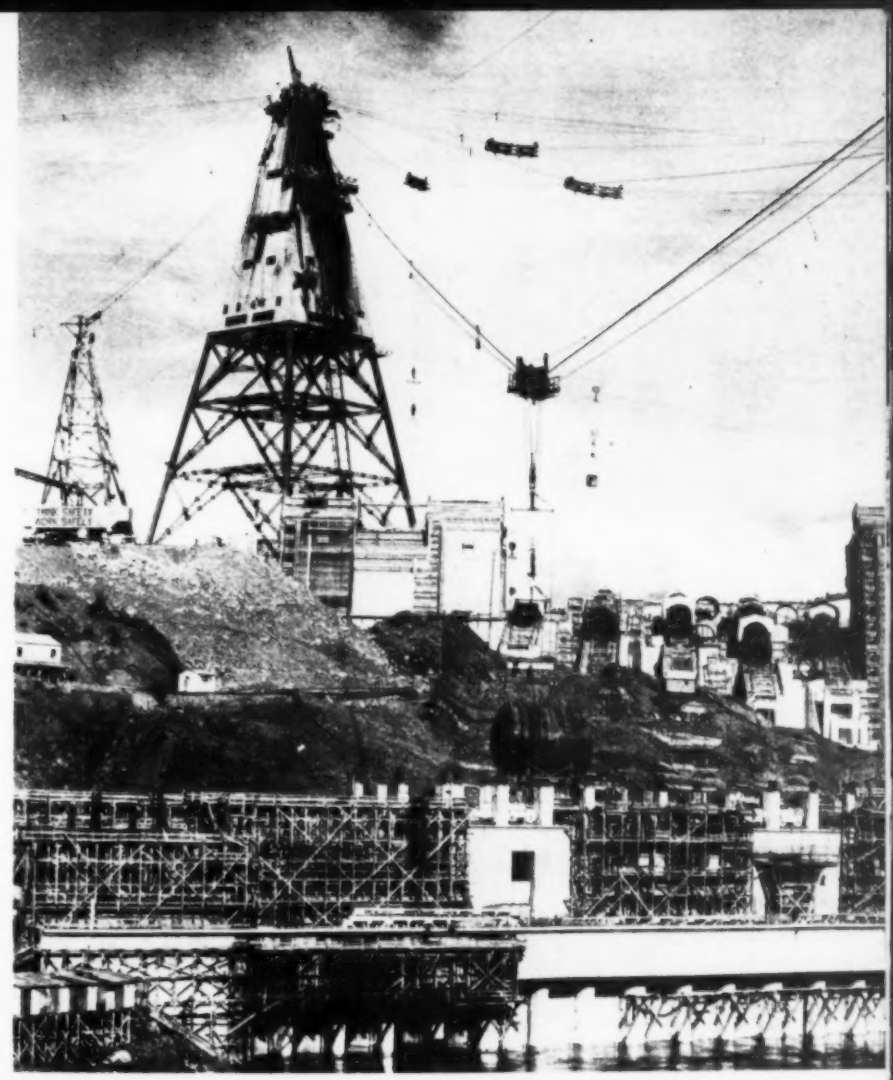
NOTTELY DAM (below) on Nottely River, tributary of Hiwassee, in Union County, Ga., south of North Carolina state line, is closed by TVA forces Jan. 24, one month ahead of schedule. Dam, about 2,560 ft. long, includes 370-ft. flashboard-controlled side-channel spillway and contains 840,000 cu.yd. of rolled earth fill and nearly 700,000 cu-yd. of rock fill rising to maximum height of 194 ft. Storage at normal pool will be 190,000 acre-ft., covering area of 4,430 acres.

FROM PROCESSING PLANT (below) on canyon slope above abutment, in background, Warner Construction Co., Inc., contractor, Chicago, hauls fine material into impervious core of Green Mountain Dam, Kemmerling, Colo., where earth fill is compacted by Caterpillar tractors drawing special tooth rollers. Rock and cobbles go from plant into pervious sections of 4,400,000-cu.yd. dam, which is major unit in U. S. Bureau of Reclamation's Colorado-Big Thompson project.

ARMY CAMP to house three divisions on West Coast puts main highway to headquarters through deep cut excavated by tractor-scraper units.



TO RELEASE MEN for war service, British women take over work in concrete products plants where they assemble reinforcement and perform other operations required in making precast railway ties, pipe and units for air raid shelters.

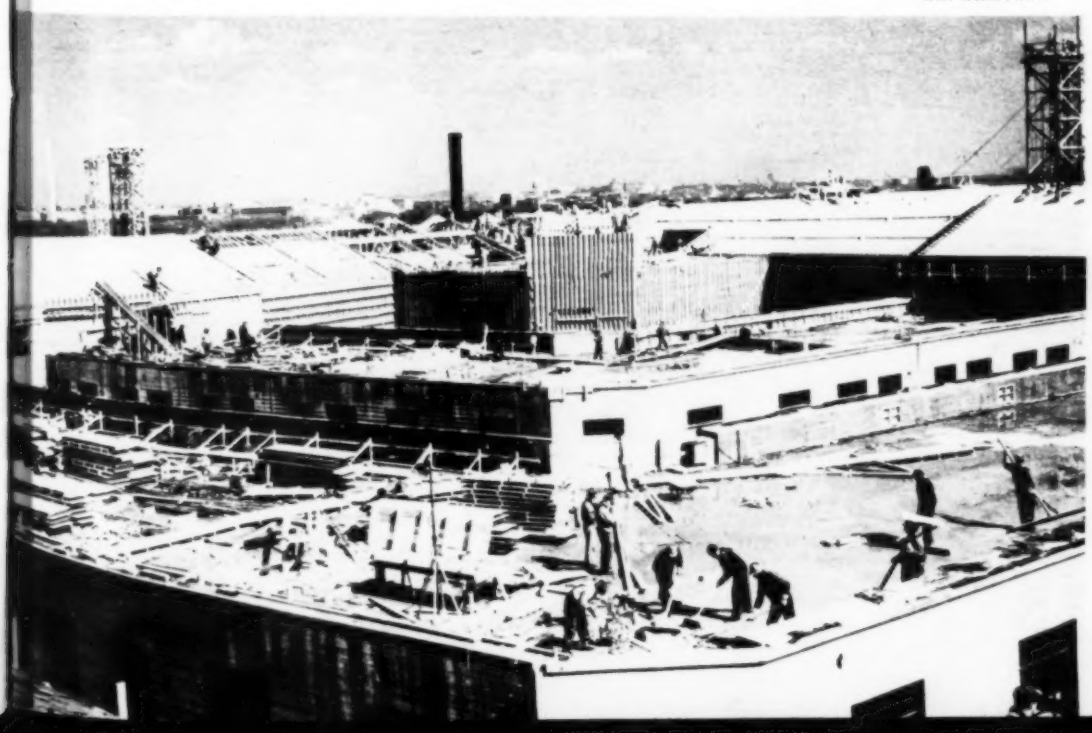


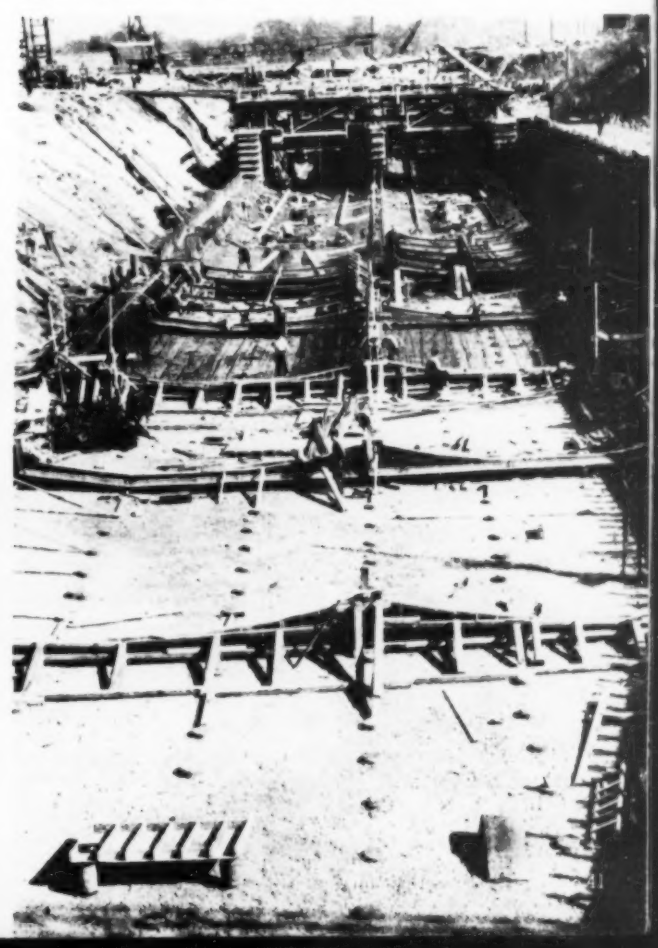
FIVE PENSTOCKS to serve equal number of 103,000-hp. turbines in power house at Shasta dam on Sacramento River, Calif., are assembled with aid of cableways radiating from 460-ft. head tower erected by Pacific Constructors, Inc., contractor for U. S. Bureau of Reclamation.

TWIN PRESSURE CONDUIT (below) of concrete delivered to forms by pumping through 8-in. pipe line from double-drum paving mixer, is built as flood control structure to carry Park River through downtown district of Hartford, Conn. Each of dual waterway openings measures 30 ft. wide and 19 ft. 8 in. high. Conduit, about 1 mi. long and costing $2,877,000, is built by B. Perini & Sons, Inc., of Framingham, Mass., under supervision of U. S. Engineer Department.

NEW WAR DEPARTMENT BUILDING (below), largest office structure in world, takes shape in Arlington County, Va., across Potomac River from Washington, D. C., as contractor group composed of Doyle & Russell and Wise Contracting Co., Richmond, Va., and John McShain, Inc., Philadelphia, push work to permit earliest possible occupancy.

Wide World Photo.





Fast Construction

OF HUGE ORDNANCE WORKS SWELLS NATION'S WAR SUPPLIES

By VINCENT B. SMITH
Associate Editor
Construction Methods

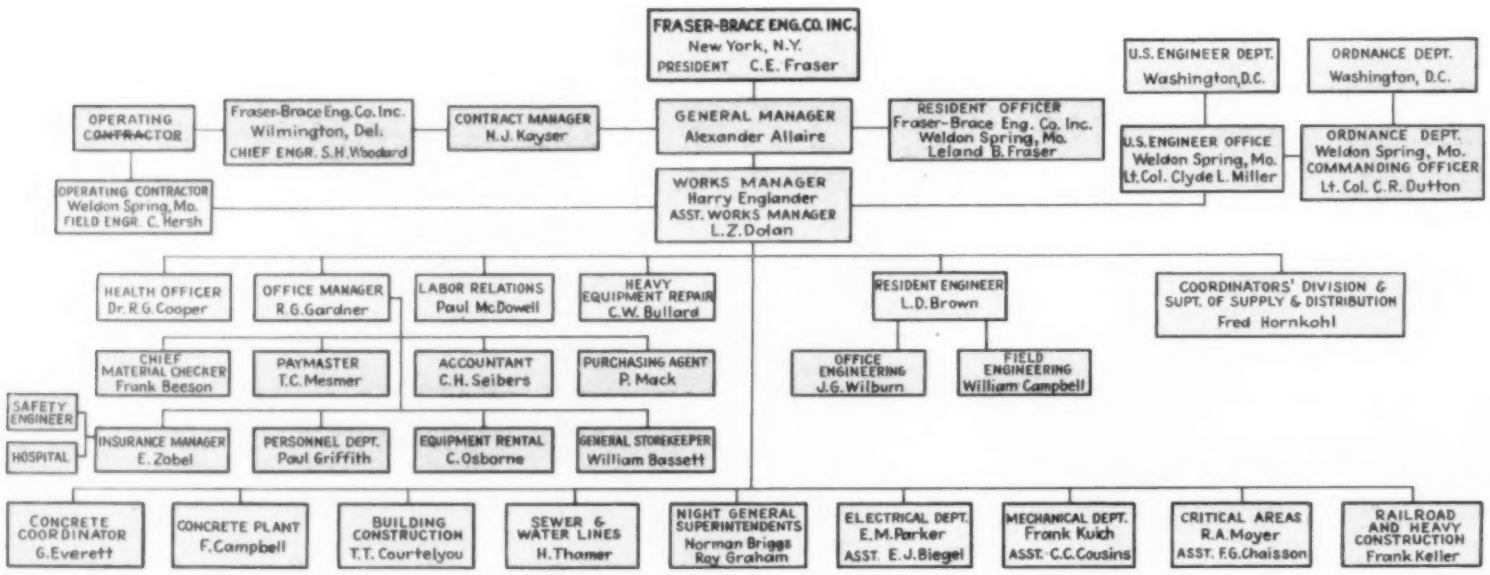
1.

Capable Organization Speeds Progress on 17,000-Acre Site

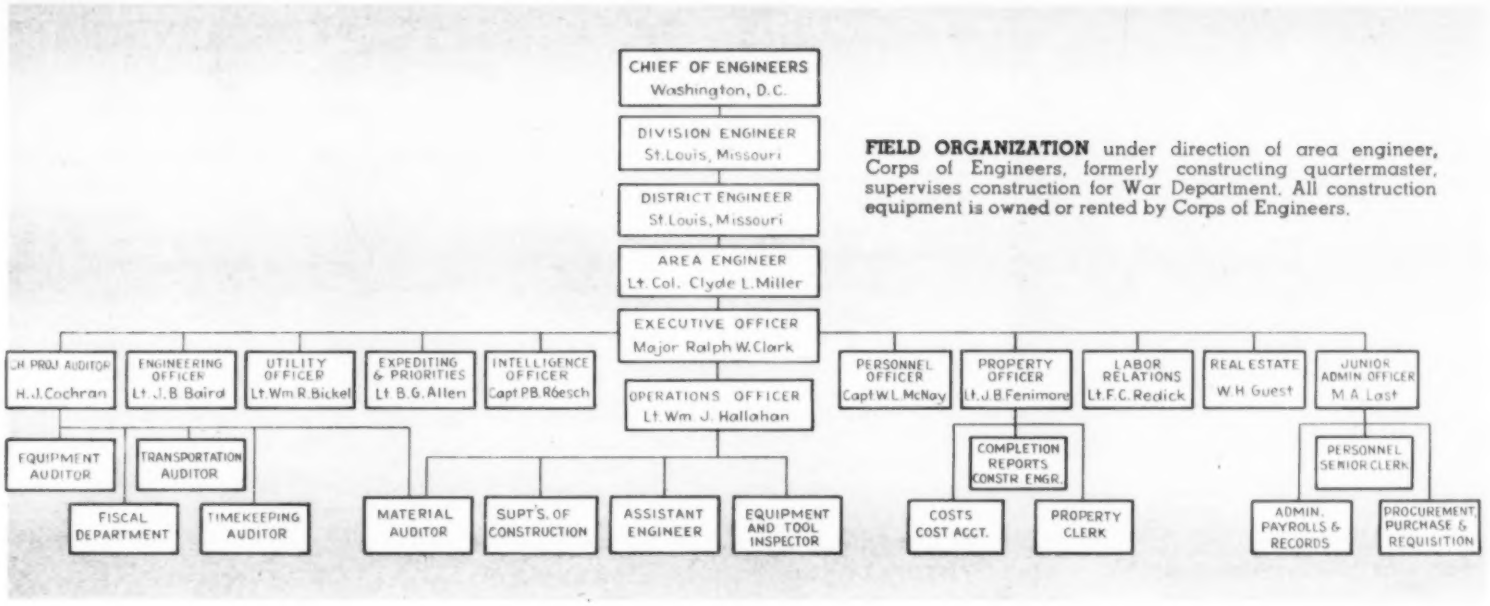
THANKS TO EFFECTIVE ORGANIZING and expediting of construction by the War Department and the Fraser-Brace Engineering Co. on the Weldon Spring Ordnance Works, Weldon Spring, Mo., the United States today has a greatly increased quantity of war materials for use against the Axis powers. Energetic drive directed toward putting production lines into operation at the earliest possible dates marked construction efforts from the day in November, 1940, when the principals in charge for the government, the Fraser-Brace firm and the plant operating contractor first gathered at the site to initiate working plans for the project. Despite handicaps resulting from necessary diversion of critical materials to another similar plant which took precedence in the War Department's schedule and in priority ranking, the constructors of the Weldon Spring Ordnance Works pushed their project with such vigor that the first section started production within ten months after Fraser-Brace began topographic surveys of the 17,000-acre tract as an essential preliminary to the drafting of original layout plans by the operating contractor.

Seven remaining components in the plant's first unit, covered by the original contract, went into production in rapid succession. Last June an expansion order added a second unit which substantially increased the value of the construction contract. By expanding their efforts with the aid of additional manpower since the attack on Pearl Harbor, the constructors now (March, 1942) have completed and put in operation the major part of the second unit and have made important progress on further expansion ordered in January. Officially designated as a five-year emergency plant, the Weldon Spring Ordnance Works is capable of continuing maximum production far beyond the five-year limit.

Actual construction of the first unit got under way during the last weeks of February, 1941, and production started



CONSTRUCTION ORGANIZATION of Fraser-Brace Engineering Co. comprises principal divisions headed by key men who are responsible to works manager. Earlier experience in building three similar plants in Canada aided in development of this organization plan.



FIELD ORGANIZATION under direction of area engineer, Corps of Engineers, formerly constructing quartermaster, supervises construction for War Department. All construction equipment is owned or rented by Corps of Engineers.

at the end of September, just eight months later. During this time, the number of men employed on the project increased several hundred percent, and the total man-hours worked in the eight months amounted to several millions. About two-thirds of the employees worked on the day shift, with the remaining one-third distributed in a ratio of about three men on the afternoon shift to one man on the midnight shift.

A huge volume of work was accomplished in the eight-month period. By the end of September, the construction contractor had moved 1,000,000 cu.yd. of excavation and had built 50 mi. of roads, 13 mi. of standard-gage railroad, 27 mi. of water mains and distribution lines, a water treatment plant with a capacity of 17 m.g.d., several 2½-mg. reinforced-concrete reservoirs, a power house to furnish steam and compressed air for processing, more than half of 40-odd miles of pipe lines, and the majority of 300 buildings involved in the original contract. In performing this amount of work, the construction forces used 8,500,000 b.-ft. of lumber, 1,500 tons of structural steel, 1,000 tons of reinforcing steel, 40,000 cu.yd. of concrete, and 350,000 tons of crushed rock, the rock being employed both for railroad ballast and for roads.

These quantities, taking care of major construction for the first unit only, were greatly increased by the addition of the second unit. The total number of buildings, for example, was expanded to more than 450. A duplicate water supply system for the second unit involved a water treatment plant and additional reservoir facilities. The new unit called for a power house with a capacity even greater than the first. Mileage of roads and railroads was substantially increased, the total for roads going up to 80 mi.

By the time the first unit went into operation, the contractor had erected 16 mi. of 7-ft. chain-link non-climbable fence, protected at the top by strands of barb wire, around the critical areas and along the main paved highway paralleling one side of the tract, and had strung nearly 19 mi. of five-strand barb wire fence along the other boundaries of the area. Fifteen large wood-frame staff residences included in the original contract had been completed and occupied and a second group of fifteen was about halfway along to completion.

An ideal location for the great plant was selected by the War Department in a tract of 17,343 acres, or 27.3 sq.mi., of rolling farm and woodland north of the Missouri River in St. Charles County, Mo. Residing in the area were 189 families, many of them descendants of Daniel Boone and other early pioneers. Because the war seemed far from the Middle Western United States when plans for the explosives plant were first broached, the patriotic willingness of the inhabitants to aid in national defense was tempered by natural reluctance to leave their old homes. Homes were vacated by degrees during the months from November, 1940, to June, 1941. Great tact and consideration on the part of the commanding officer and his staff proved effective during this period in obtaining release of properties and in providing outside replacements for three schools, one of them a con-

CONSTRUCTION AND OPERATION of plant are under top supervision of Lt. Col. C. R. DUTTON, Ordnance Department, commanding officer. HARRY ENGLANDER (right), works manager, directs all operations on project for Fraser-Brace Engineering Co.

IN CHARGE OF CONSTRUCTION for War Department, first as constructing quartermaster and now as area engineer, Corps of Engineers, Lt. Col. CLYDE L. MILLER sees that equipment requisitions get quick action.

TWO-WAY RADIO SETS in cars used by plant guards and by officer of the day maintain ultra-short-wave contact between these units and plant radio station which has tie-in on medium-short-wave band with state police system.

solidated high school, without losing the good-will of the property owners.

Rolling terrain and scattered woodland on the site afford natural concealment for the plant and greatly simplify the problem of camouflage. The broken terrain likewise is of assistance in localizing damage caused by possible explosions. Buildings in each process line are designed and spaced to minimize the effects of fire or explosion. As a further precaution against stoppage of production by external attack or internal accident, each unit of the plan is provided with independent water and power utilities, enabling it to operate without reliance on the facilities of other units.

Construction Organization

Among the factors contributing to rapid progress, the efficient organization of construction personnel is preeminent. Prior experience in building three similar plants in Canada fitted Fraser-Brace to organize and prosecute this job without waste motion or loss of time. Accompanying charts show the organization plans of the construction contractor and of the constructing quartermaster, the latter now affiliated with the Corps of Engineers. The entire project, including the construction and operating organizations, functions under the general direction of Lt. Col. C. R. Dutton, Ordnance Department, commanding officer of the post. Lt. Col. Clyde L. Miller, formerly constructing quartermaster and now area engineer, Corps of Engineers, heads the War Department's construction organization on the site, while Harry Englander, works manager, is in charge of all operations on the project for the Fraser-Brace Engineering Co., New York City, architect-engineer and construction contractor for the War Department.

Under Mr. Englander, the Fraser-Brace organization is broken down into ten principal divisions, each one headed by a man reporting directly to the works manager. Three of the divisions are reserved for the essential engineering, office, and coordinatr units, and seven divisions are set up to cover important branches of field construction: (1) buildings, (2) mechanical work, (3) electrical work, (4) railroad and heavy construction, (5) critical areas, (6) concrete, and (7) sewers and water lines. A superintendent at the head of each construction division has full authority and responsibility for all the work under his charge.

Engineering

All engineering and construction activities of the Fraser-Brace Engineering Co. are carried out in conformity with the requirements and recommendations of the operating contractor, acting as consultant on design. The layout and design of features related to the plant's processing facilities are made in Wilmington, Del., by a Fraser-Brace staff under the direction of Silas H. Woodard, chief engineer, working in close collaboration with the operating contractor's engineering department, headed by J. W. Hanson, Jr., chief engineer, and J. C. Allen, assistant chief engineer. Execution of the plans at the site is supervised for the operating contractor by a resident staff under the leadership of C. G. Hersh, resident engineer. F. S. Pollock, director of operations on two projects for the operating contractor, and George Barnes, general manager at Welden Spring, were instrumental in placing the new plant on a production basis ahead of schedule.

Plans for facilities such as roads and railroads, not directly related to manufacture, are produced on the job by the engineering division of the construction contractor's general organization. This division, headed by L. D. Brown, resident engineer, employs more than 400 men to take care of its manifold responsibilities in design, field engineering and inspection.

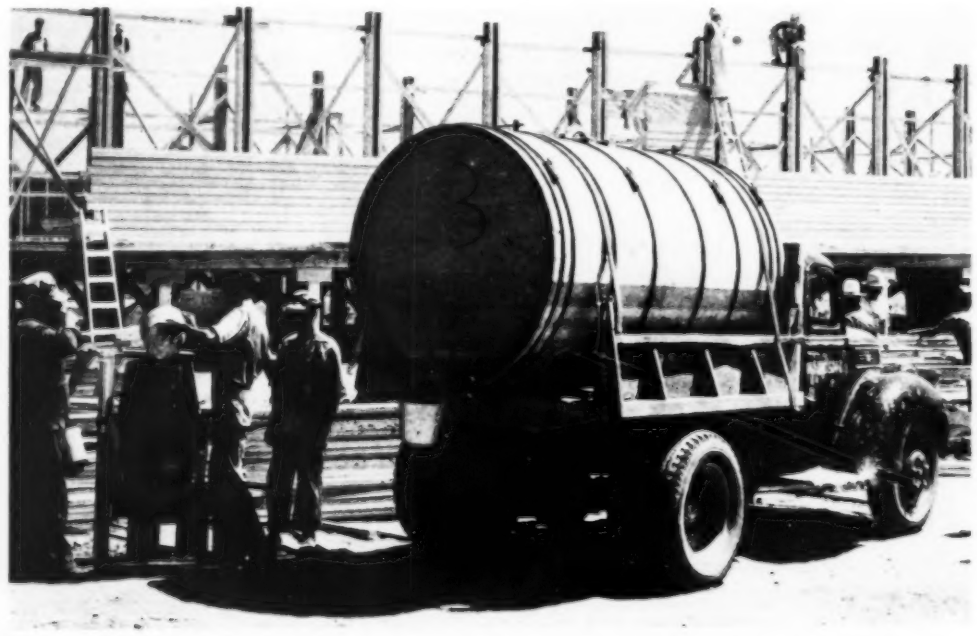
Coordinator's Function

Expediting and distributing of materials constitute a major problem on a project of this size. Deliveries are expedited from two offices, at Weldon Spring and at Wilmington, Del. Those originating east of an arbitrary line from Detroit to Florida are handled by Wilmington and all the remainder by Weldon Spring. The coordinator at Weldon Spring is responsible for anticipating all job needs for materials and equipment; he receives daily reports from the expediters in Wilmington.

From the time orders are placed, the coordinating section keeps a constant check on them to assure deliveries on schedule. By telegraph and telephone, by correspondence and by direct contact with vendors through field expediters, the coordinator exerts any pressure required to make sure that shipments are dispatched in ample time for delivery. On arrival at the job, the shipments come under the control of the coordinator's staff for identification and distribution. The department operates the plant's permanent classification yards and switch engines, which serve during construction to handle cars of materials and equipment.

Office System

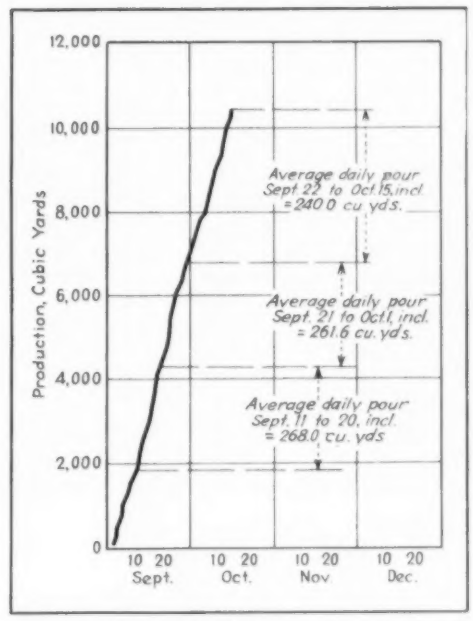
Duplicating on a smaller scale the master plan of the general construction organization, the office department is broken down into eight main subdivisions under the office manager. At the head of each subdivision is a key man who assigns specific duties to groups and individuals under his direction. The entire system facilitates the proper distribution of work, definitely fixes re-



WOOD STAVE TANK on dump truck distributes drinking water to barrels set up in convenient locations for construction workmen. Dispenser for paper cups is erected beside each barrel; water is drawn off through thumb-release tap. Regular cleaning keeps tanks and barrels free of algae.

sponsibility, and lightens the load on the key men, who otherwise would be overburdened with demands on their time.

In addition, office work is systematized to maintain a uniform daily load, without peak overloads. This systematizing of office work is coordinated with field construction operations to conserve the time and aid production of the field crews. Thus every day from Monday through Friday is a pay day at Weldon Spring, an approximately equal number of workmen being paid on each day. To reduce the number of machines in the paymaster's office, and to simplify the work, the contractor had the Underwood Elliott Fisher Co. build a special machine which not only makes up the payroll but also writes a statement of each man's earnings, his check and his receipt, all in one operation.


12,000
10,000
8,000
6,000
4,000
2,000
0
Production, Cubic Yards
Average daily pour Sept 22 to Oct 15, incl = 240.0 cu yds.
Average daily pour Sept. 21 to Oct 1, incl. = 261.6 cu. yds.
Average daily pour Sept. 11 to 20, incl. = 268.0 cu. yds
10 20 Sept.
10 20 Oct.
10 20 Nov.
10 20 Dec.

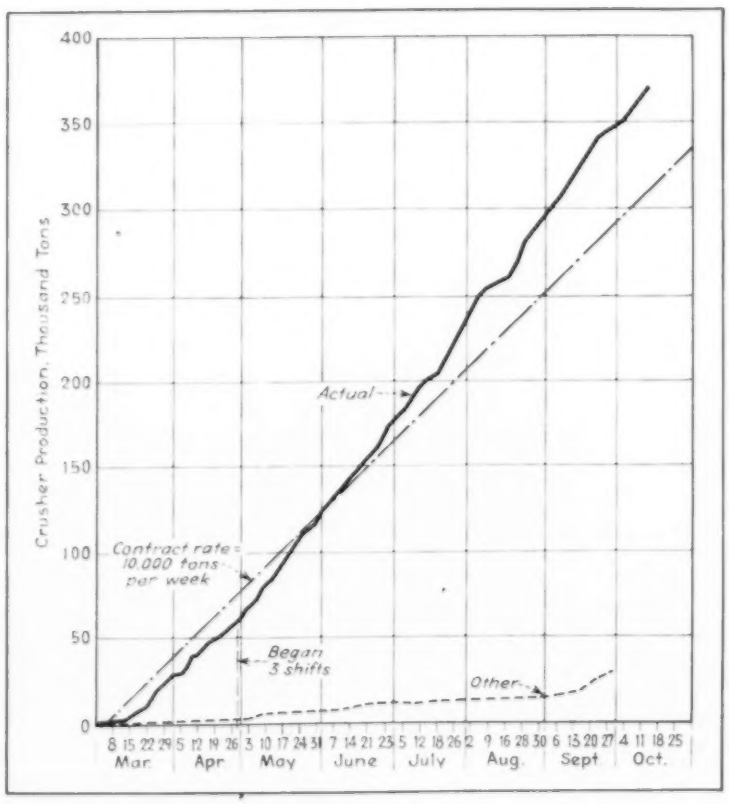
NEW CONCRETE PLANT consisting of central batching unit and sixteen 2-yd. truck mixers supplies moderate job requirements during first few weeks of operation. Production later increases to 60,000 cu.yd.

2... Mechanized Equipment Leads Constructive Drive to Hasten Plant Completion

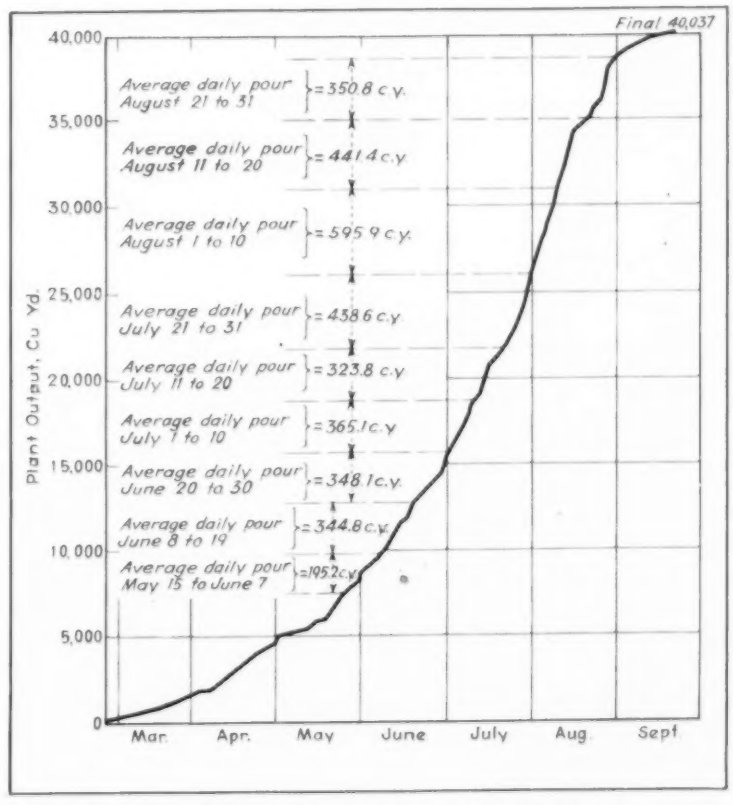
DIESEL-POWERED AND GASOLINE-POWERED EQUIPMENT has provided the punch that enabled the construction forces to pile up their excellent record of accomplishment in building the Weldon Spring Ordnance Works. Assembled by the War Department in accordance with requirements marked out by the Fraser-Brace field organization, the equipment units have been capably operated, carefully maintained and skillfully directed to obtain maximum production. All construction equipment mentioned in these notes was placed on the job during the eight months leading up to completion of the first unit to go into operation. At that time, the equipment was owned or rented by the Office of the Constructing Quartermaster since transferred to the Engineer Corps. Equipment units released from Fort Leonard Wood and other Army projects were drafted to speed construction at Weldon Spring.

Earthmoving Equipment — Grading for railroads, highways, tanks, buildings and utilities of the plant's first unit involved 1,000,000 cu.yd. of excavation. Starting with an equipment inventory of moderate proportions, the constructors during the first few months of grading work increased the list to more than 300 earthmoving units, as indi-

(Continued on page 48)


400
350
300
250
200
150
100
50
0
Crusher Production, Thousand Tons
Actual
Contract rate = 10,000 tons per week
Began 3 shifts
Other
8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 5 12 18 26 2 9 16 28 30 6 13 20 27 4 11 18 25
Mar. Apr. May June July Aug. Sept. Oct.

REQUIRED PRODUCTION of 10,000 tons per week of crushed rock is surpassed from day, noted above, when quarry crushing and screening plant starts three-shift operation


Final 40,037
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Plant Output, Cu Yd.
Average daily pour August 21 to 31 = 350.8 c.y.
Average daily pour August 11 to 20 = 441.4 c.y.
Average daily pour August 1 to 10 = 595.9 c.y.
Average daily pour July 21 to 31 = 458.6 c.y.
Average daily pour July 11 to 20 = 323.8 c.y.
Average daily pour July 1 to 10 = 365.1 c.y.
Average daily pour June 20 to 30 = 348.1 c.y.
Average daily pour June 8 to 19 = 344.8 c.y.
Average daily pour May 15 to June 7 = 195.2 c.y.
Mar. Apr. May June July Aug. Sept.

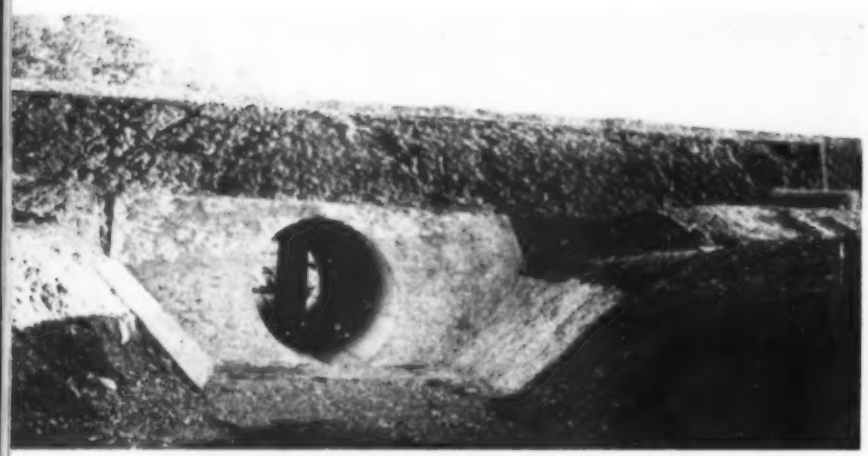
CONCRETE OUTPUT by subcontractor supplying 40,000 cu.yd. for first unit of ordnance works equals as much as 3,000 cu.yd. per week mixed and distributed by truck mixers hauling from central batching plant.

Weldon Spring Ordnance Works

...continued

STONE-PAVED SLOPES prevent erosion of steep banks in cut on plant railroad constructed inside 17,000-acre site.

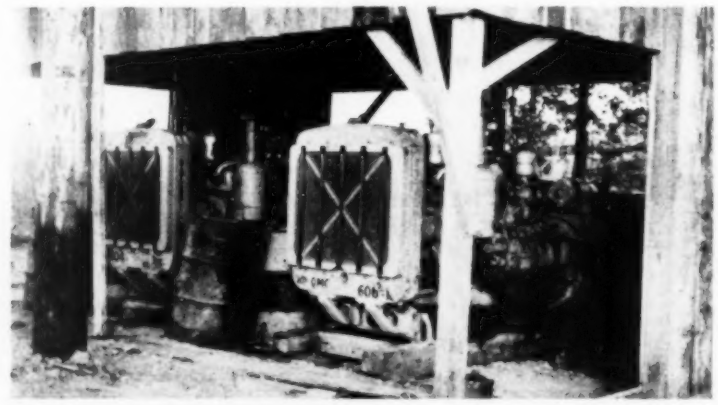
THREE-SHIFT OPERATION keeps lights burning all night at Cedar Rapids crushing and screening plant producing more than 10,000 tons per week of crushed rock for roads and for railroad ballast.



CORRUGATED METAL CULVERT, from which struts have not yet been removed, passes storm drainage through railroad embankment.

ON NIGHT SHIFT, pusher tractor equipped with bulldozer aids Allis-Chalmers tractor and Gar Wood scraper to pick up full load quickly.

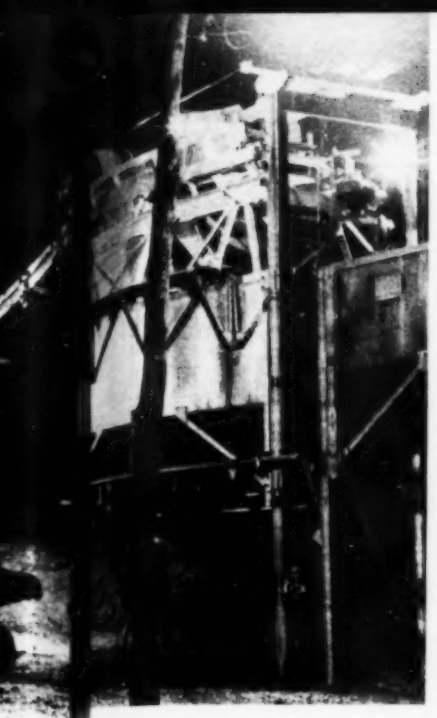
ASSEMBLED CORRUGATED PLATES form large-diameter arch culvert under plant highway.

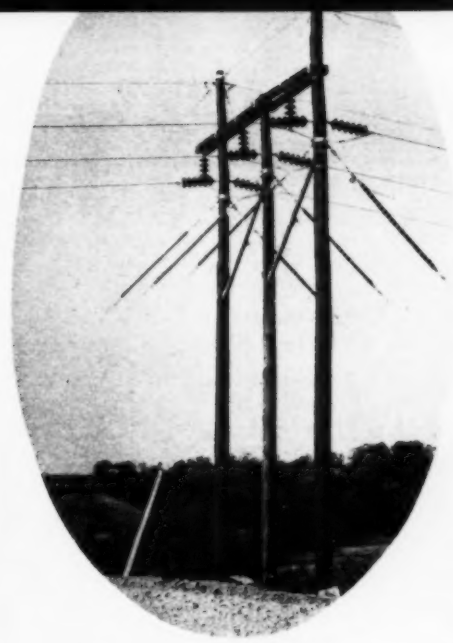


TEMPORARY ELECTRIC POWER to drive pump at water reservoirs is furnished by pair of 74-kw. diesel-generator sets.

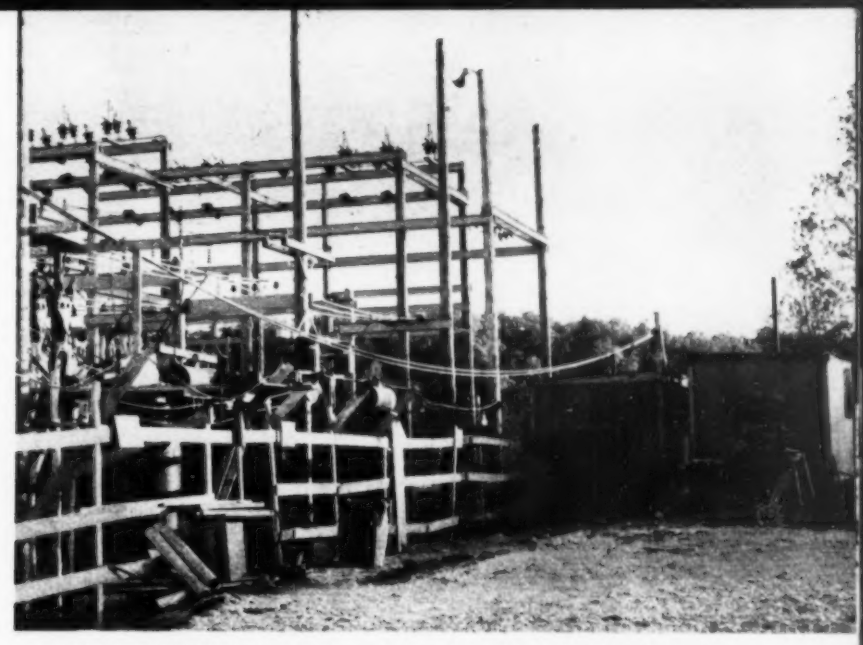
GRADING FOR 80 MILES OF ROADS (below) inside plant area is done with Caterpillar-Le Tourneau tractor-scraper units.

BLASTED ROCK (below) in quarry is loaded by Link-Belt power shovel into Koehring dumptors hauling to hopper over primary crusher. Beyond shovel, two wagon drills are sinking blast holes.

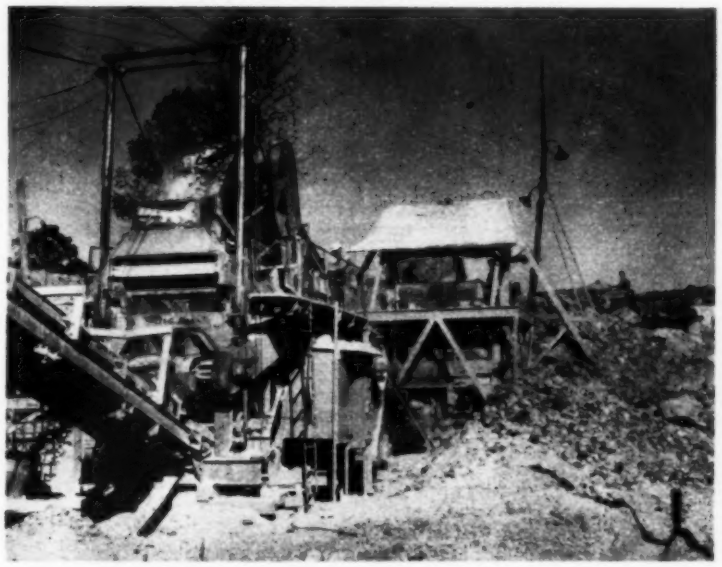




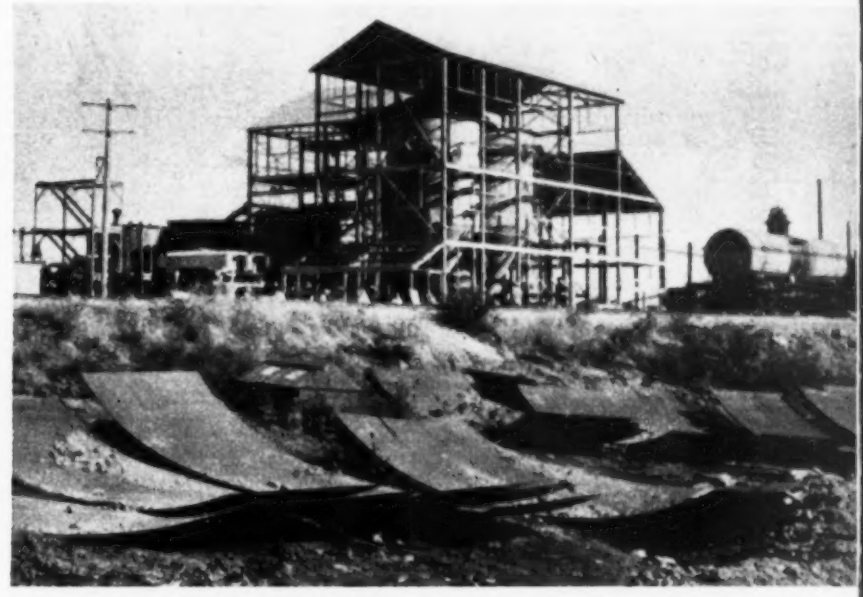
OUTSIDE ELECTRIC POWER is brought into plant over 33,000-v. transmission line.



AT MAIN SUBSTATION next to power house, two diesel-electric sets separately housed supply temporary power until connections can be completed to outside power sources.

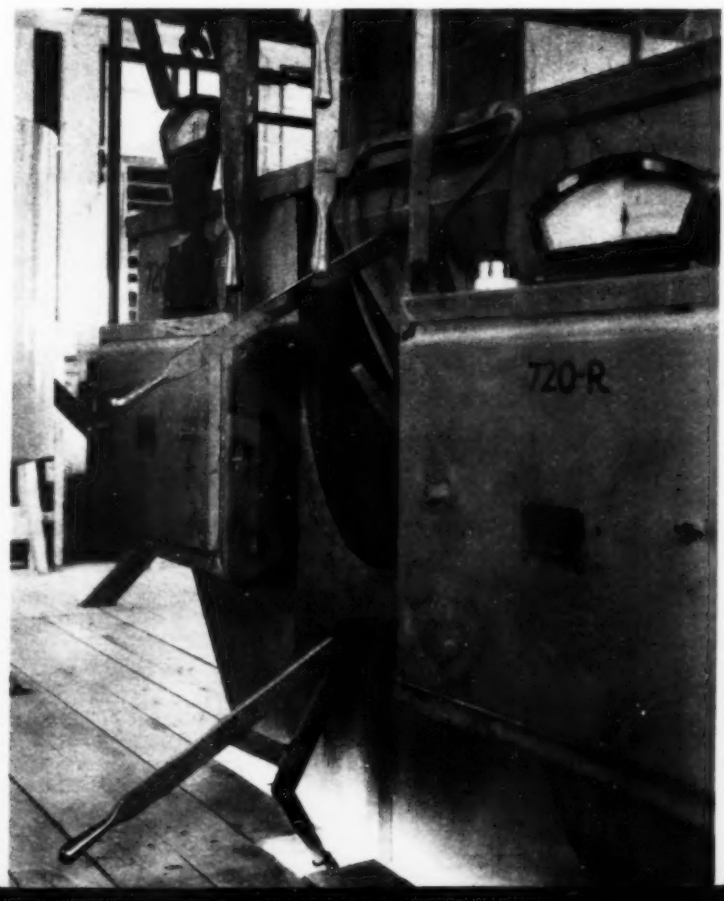


SECONDARY CRUSHER driven by diesel power unit reduces rock delivered by belt conveyor from primary crusher.



CURVED STEEL PLATES for welded tank construction are stocked below railroad tracks in front of steel frame building for manufacture of one material used by plant.

INSIDE BATCHING PLANT (below), weighing of aggregates is manually controlled, but automatic controls are provided for cement and water.

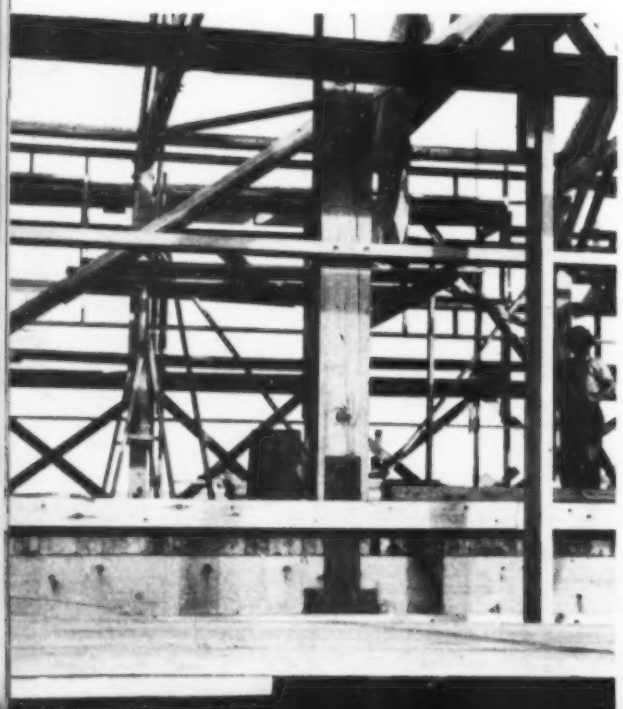


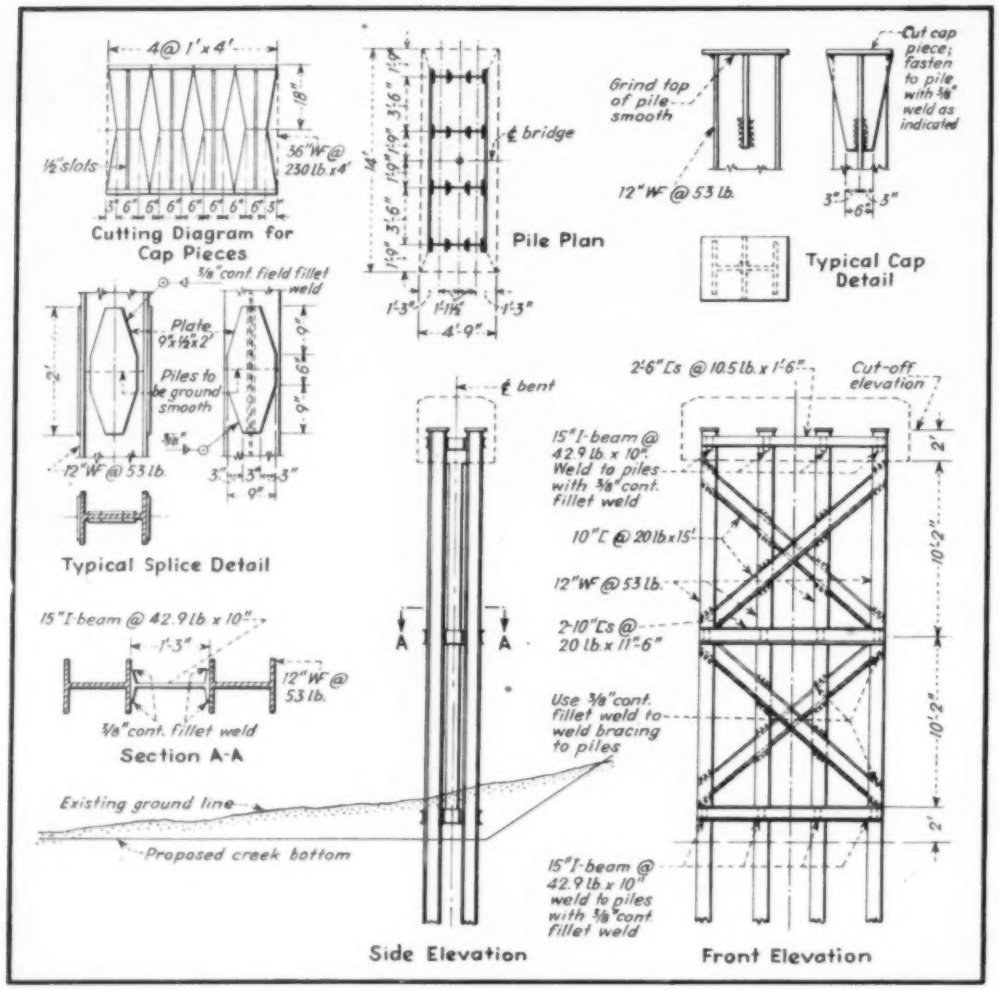
NEW BATCHING PLANT (below) is clean, compact Johnson unit capable of loading 2-yd. truck mixer with cement, aggregates and water in 17 sec. actual charging time.

PAINTERS BRUSH BLACK ASPHALT on one side of vitrified corrugated iron sheets used to inclose steel-frame buildings such as manufacturing structure in background, where welded steel tanks are being erected.

WOOD SIDING is used on steel frame of house designed to minimize hazards involved in manufacturing process.

BOLTED PLATES (below) anchor 8x8-in. posts supporting 33-ft.-span timber trusses framed with toothed-ring and split-ring connectors in box factory. Trusses are set on 8-ft. centers.





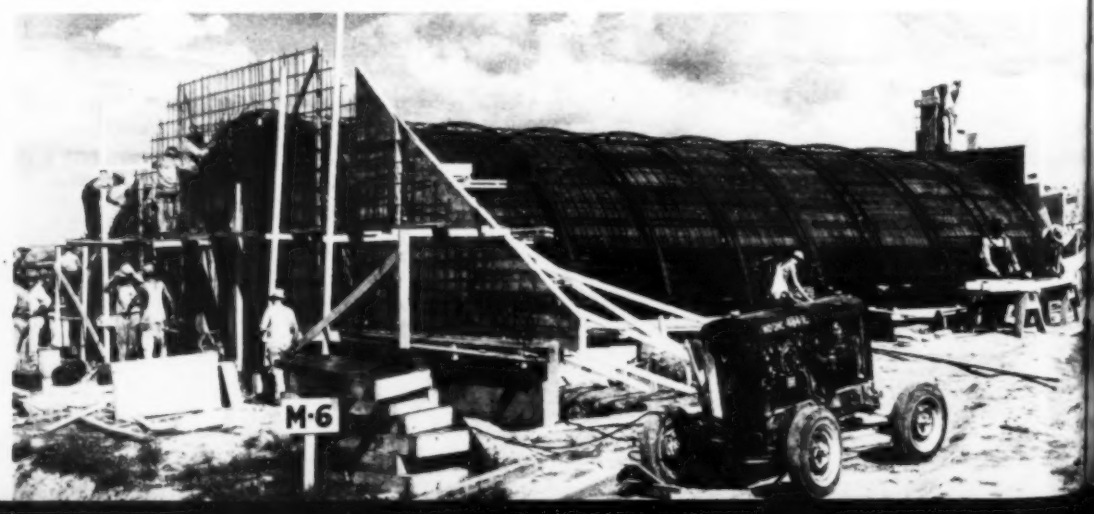
STEEL PILE BENT for railroad bridge, designed on job by engineering department of construction organization, makes extensive use of welding.

cated by an accompanying tabulation. The table follows Part 4 of this article, in the back of the book. By operating in full force on the day shift and in partial force on the second shift, this mass of equipment moved material at rates up to 75,000 cu.yd. per day and completed the grading for 50 mi. of roads, 13 mi. of standard-gage railroad, 3 mi. of 36-in.-gage tramway tracks, 300 buildings, a large number of tanks and 34 loading and unloading docks with a speed that kept the earth-moving outfits well ahead of the construction forces following them.

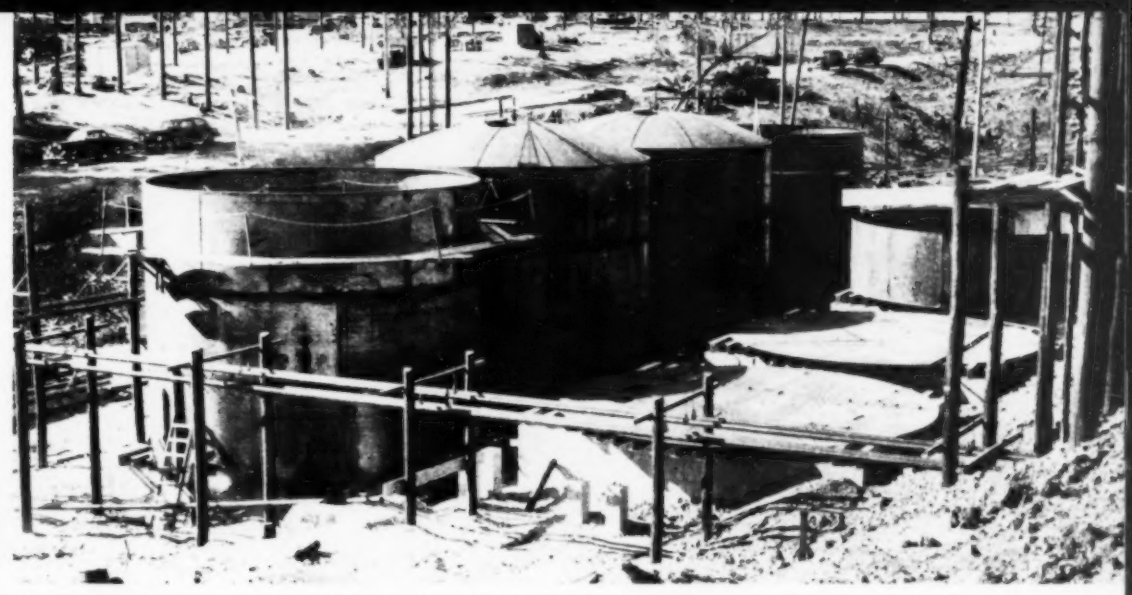
Railroad access to the site was one of the first problems facing the plant builders. A preliminary survey for a spur connection from the nearby Missouri-Kansas-Texas line was undertaken simultaneously with the topographic survey of the site, and construction of this access railroad was pushed to complete tracklaying within five weeks after heavy work got under way on the plant itself. In a distance of 2¼ mi., the spur railroad gains 200 ft. in elevation, without any grades in excess of 1½ percent. Additional rail lines and two classification yards increased the total trackage for the first plant unit to 13 mi.

During the early part of the job,

WOODEN INTERIOR PANELS (below) supported by shoring and steel-plate exterior panels fastened to temporary channel ribs provide form for reinforced-concrete arch roof of igloo-type storage unit. Workmen are setting and welding reinforcing steel for front wall.



FOR FIRE RESISTANCE. brick walls are selected to inclose building which houses one stage of manufacturing operation.



ARC WELDING is employed in field fabrication of eight 24x20-ft. tanks forstorage of reclaimed liquids.

truck hauling was the only method of delivering materials and equipment, and trucking continues to play an important role in transporting supplies. From the paved highway paralleling one boundary of the 27.1-sq.mi. plant tract, a graveled state road entered the site and forked into two branches serving parts of the area. Existing rural roads provided access to other portions of the property. Reconstruction and relocation of existing roads account for a minor percentage of the total of 50 mi. of highway built for the plant's first unit.

Roads in general have crushed rock surfaces 20 ft. wide and 6 to 8 in. thick. Principal routes are given an oil surface treatment on top of the crushed rock. Corrugated metal pipe and plate assemblies are used for culverts; asphalt-coated metal was substituted for galvanized when the zinc-protected product went on the critical list.

As all employees commute by automobile, the main entrance road carries extremely heavy traffic at the beginning and end of the day shift. To relieve traffic congestion at the entrance, the commanding officer authorized construction of a second roadway to convert the heavily-traveled artery into a divided four-lane highway. A section of the paved road in front of the entrance likewise was made into a divided four-lane highway; the boundary fence of the reservation has been set back along this road to provide right-of-way for the state to extend the dual construction in the direction of St. Louis to a bridge crossing the Missouri River.

Crushed Rock

An excellent source of hard limestone is available inside the plant area, and the construction engineers determined to develop this supply to provide surfacing for roads and ballast for railroads. Weekly production of 10,000 tons was estimated to be required for the two purposes, and this output was specified in a subcontract awarded by the Fraser-Brace Engineering Co. to the Concrete Materials Construction Co., Cedar Rapids, Iowa. An accompanying chart shows that the subcontractor exceeded the scheduled production rate after starting three-shift operation of a quarry crushing and screening plant. To meet additional demands for the expanded project, the subcontractor opened a second quarry and equipped it with another crushing plant.

At the older plant, raw material drilled and blasted out of a deep limestone quarry is loaded by a power shovel into dumptors which spill the blasted rock into a hopper over the primary crusher. From this crusher, a belt conveyor carries the rock to a reduction crusher. Rock passing a screen under the latter crusher is transported by another belt conveyor to shaker screens over steel bins which charge the trucks hauling graded material from the plant. Oversize material rejected by the screen at the secondary crusher is returned by belt conveyor to the primary crusher.

Two diesel power plants drive the crushers, and a third diesel unit powers a 150-hp. generator supplying energy to electric motors which operate the belt conveyors and the shaker screens. The generator also furnishes power for the lights which illuminate the plant at night.

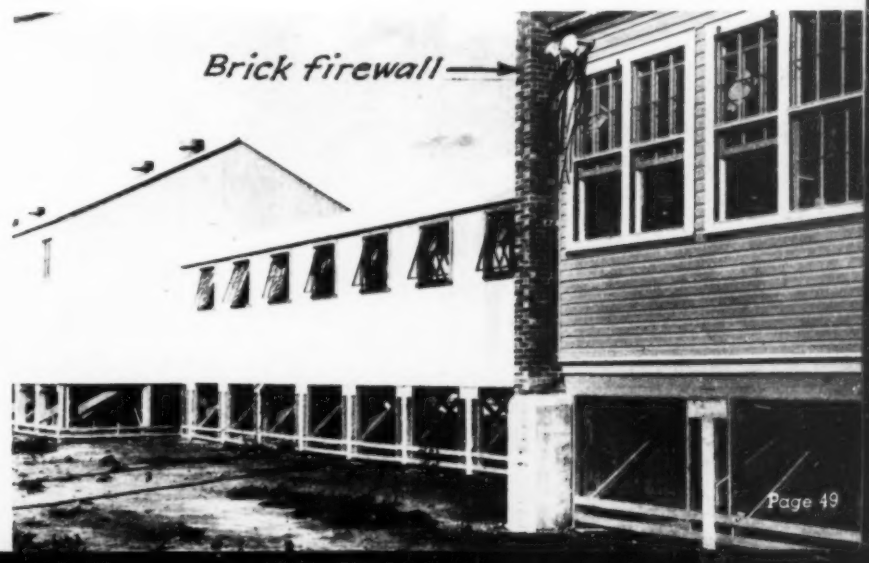
To provide temporary electric power for night lighting and for driving permanent water pumps during the construction period before connections had been completed to outside power lines, the project constructors utilized about 20 Caterpillar diesel-electric sets of 74-kw. (100-hp.) rated capacity. Five of these units supplied power for pumping at the wells and at the water treatment plant, two operated the pump at the reservoirs, and another pair furnished temporary power at the location of the power house.

Concrete Plant

A total of 40,000 cu.yd. of concrete, sufficient to complete nearly all the concrete structures included in the plant's first unit, was supplied under a sub-

BEVELING, CHAMFERING and MITERING (below), as well as routine cutting operations, are expedited by power saw units.

BRICK FIRE WALLS (below) separate sections of long building for box manufacture and storage. Timber frames of buildings rest on T-head concrete columns, and space under floors is protected against intrusion by wire fencing.



St. Louis, in truck-mixers batched at a central plant on the site. Maximum production during the operation of this plant was 3,000 cu.yd. per week.

To furnish all the remaining concrete for construction of the expanded plant, amounting to some 60,000 cu.yd., the general contractor early in September began operation of a new batching plant serving a fleet of 16 Jaeger 2-yd. high-dump mixers mounted on Ford trucks. As closed drums were desired to hold the heat in the concrete during the winter, the mixers are equipped for drum-gate charging instead of automatic rear-end charging. Both cement and two sizes of aggregates are batched in a compact Johnson plant with bin capacities of 150 cu.yd. for aggregates and 300 bbl. for cement. Batching equipment includes automatic cutoffs for cement and water and manual controls for the aggregate. Actual charging of a 2-yd. batch into a truck mixer takes 17 sec.

Building Operations

Buildings in the process lines are designed to minimize any danger during the various stages of production. Thus the house used in the first stage of processing is constructed of brick because of the fire hazard in this structure. Other houses are designed with steel frames and wood sheathing. Some buildings are of steel-frame construction inclosed by walls of corrugated iron with a vitrified lining to reflect light on the inside and a painted coating of black asphaltum on the outside. Pack houses, in which the product is packed for shipment, are lined with impregnated paper to prevent accumulation of dust.

Each manufacturing unit requires a total of about 25 buildings. With the exception of concrete structures for certain purposes, including power houses, water supply and sewage treatment, the remaining buildings on the project are mainly of wood-frame construction.

For these buildings and for formwork on the concrete structures, the project employed during September an average of more than 1,200 men in the carpenter force, including foremen, journeymen and helpers. The work of this important construction force was expedited by the use of 30 Beach power saws distributed about the project.

Most of the tanks for the first unit of the plant are built up of curved plates with welded joints. The steel tanks are of varying sizes, ranging from 4 ft. in diameter by 20 ft. high to 8x35 ft. and 30x24 ft. Some are of stainless steel.

3... 62 Welding Outfits Make Joint Connections in 30 Mi. of Pole Pipe Lines

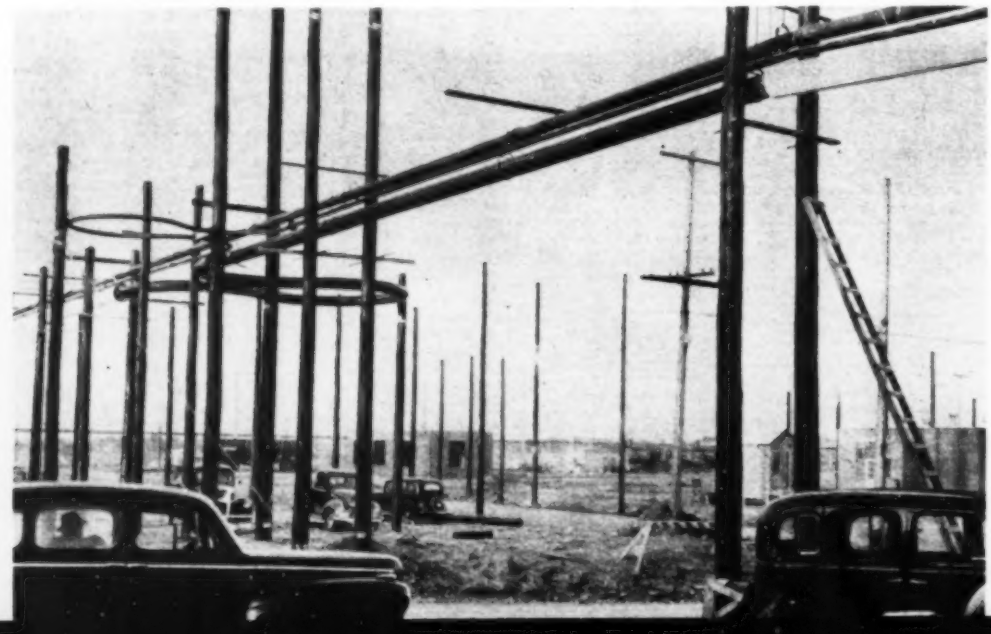
IN EACH PROCESS LINE at Weldon Spring, steam and air, as well as other substances, are transported in pipes suspended from crossarms of pole lines. Other hung pipe lines convey air and steam from the power house to the various production lines. These pipes and others supported from poles account for the 40 to 45 mi. of hung pipe lines in the plant's first unit. Some 30 mi. of the total erected on pole lines called for welded joints which were made by steamfitter welders operating 62 welding outfits, oxyacetylene and electric.

Hung pipes distribute steam for heating and air for blowing certain liquids through pipes in each process line, while other pipes on pole lines convey liquids and vapors between processing units. Except for some high-chromium iron pipe with flange joints, all the pipe in the process lines is steel with welded joints. Practically all steam and air lines consist of steel pipe with welded joints. Steam pipes are jacketed with magnesia insulation. At the power house, water lines, as well as steam and air lines, include a great number of fittings cut and fabricated by welding on the job and connected into the pipe lines by welded joints.

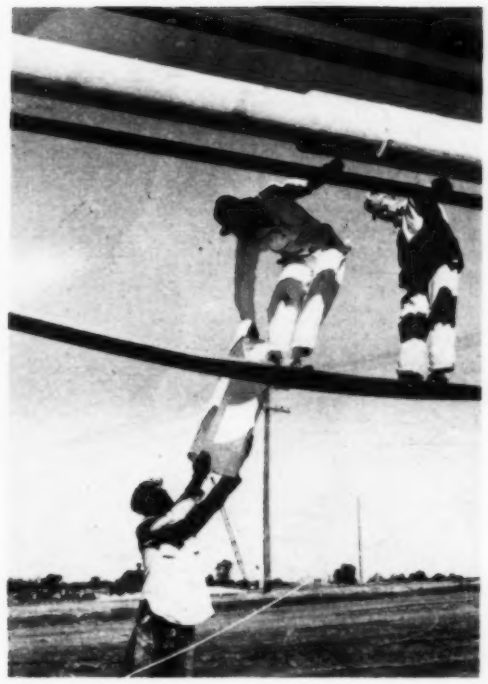
Welding Operations — Because the code of the Hartford Steam Boiler Inspection & Insurance Co. at present covers only electric welding for high-pressure lines and vessels, connections in pipes of this character at the power house are electrically welded. Electric welding is used also for a number of joints on the outside pole lines, but the bulk of this welding is performed with oxyacetylene outfits. The total of 62

MULTIPLE PIPE LINES (below) hung from pole crossarms traverse small gully and rise to higher elevation on opposite side.

STEAM AND AIR LINES (below) cross highway on way from power house to processing area. Expansion loops in steam pipes are connected into lines with flange joints, and pipes are covered with two layers of magnesia insulation.



WELDED FITTINGS in compressed air line at power house receive approval of F. C. KUICH, mechanical superintendent.



DOUBLE THICKNESS of 1-in. magnesia insulation is wired on steam pipe supported on pole line.

welding outfits operated on the first plant unit by the mechanical division of the contractor's organization consisted of 48 oxyacetylene units and 14 electric welders.

Joint welding has continued as standard practice for additional pole pipe lines required by expansion of the plant. The principal joint welding is on 2-, 3-, 4-, 8- and 12-in. pipe, with a few joints on 24-in. pipe. Pipe comes to the job in random 20-ft. lengths and is welded at a pipe shop into units about 45 ft. long for erection and final joint welding on the pole lines. Pipe bends also are made at the pipe shop by heating and bending to desired curvature. Accompanying photographs show operations both in the pipe shop and in the field. A mile of pole pipe line requires about 120 shop welds and an equal number of field welds.

Pipe welding in the shop and on the pole lines is of first grade, but the finest examples of the welder's skill are found in the power house. Using electric weld-

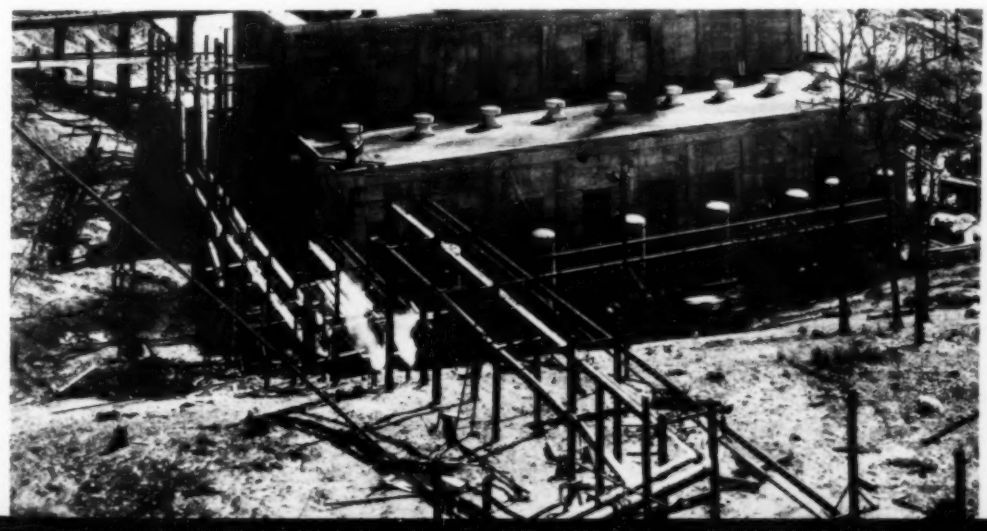
GAS WELDING TORCH is employed by operator to make joint connection in steel pipe erected on pole line.

SHOP WELDERS using oxyacetylene torches make joint welds in double-length pipe units for erection on pole lines.

TRUCK-MOUNTED POLE OUTFIT equipped with derrick and hole digger driven from truck engine handles and installs poles for pipe and electric lines on project.

ARC WELDER employing 5/32-in. coated electrode builds up four beads in double-30-deg. bevel joint of 8-in. steam pipe with 5/16-in. wall thickness, joining two 22-ft. lengths into 44-ft. unit for erection.

POLE PIPE LINES (below) carrying steam and air climb hillside from power house, in background, equipped with boilers and compressors.



BY HEATING SUCCESSIVE AREAS (below) of steel pipe with gas torches, shop crew is able to make bend of same curvature as template rod bent by pipe erectors in field.

WATER TREATMENT PLANT includes concrete tanks for rectangular covered aerator basins, in foreground, filter beds, at right, and circular agitators, in left distance, adjacent to two-story reinforced-concrete chlorinator house.

ing for alloy steel lines carrying boiler pressure and gas welding for air and cold water lines, the steamfitter welders fabricate fittings which cannot be purchased for pipe up to 16- and 20-in. size. Reducers on 16- and 18-in. lines, for example, are made by cutting out triangles, swedging and welding to obtain the required reduction in diameter.

Erection of Poles — For the total of 40 to 45 mi. of hung pipe lines included in the plant's first unit, about 15 mi. of supporting pole lines had to be erected. This mileage of pole lines called for installation of more than 4,000 creosoted wood poles. To handle and erect these poles and a large number of other poles for electric and telephone lines, the contractor operated truck units equipped with hoist derricks and post hole diggers driven by power takeoffs from the truck engines.

4... Wells and Treatment Plants Provide Pure Water in Quantity

CONCRETE PIPE MAIN (below) 30 in. in diameter delivering water to reservoirs is supported on timber trestle pending burial of tanks and main under earth fill.

PUMP HOUSE at water well is reinforced-concrete structure built with plywood forms to assure smooth inner surfaces.

TO FURNISH PURE, SOFT WATER in required volume to the first unit of the Weldon Spring Ordnance Works, the constructors installed vertical wells of enormous capacity, built a plant capable of treating 17 mgd., erected several 2½-m.g. covered concrete reservoirs, and placed 27 mi. of mains and distribution lines, including 100,000-gal. elevated steel tanks to maintain pressure in the distribution system. The second unit of the plant is served by independent water supply facilities involving additional gravel-wall wells, a separate treatment plant, one 2½-m.g. underground concrete reservoir and one elevated water tank.

As an indication of the amount of water required, the daily production from the Layne Western Co. wells installed for the first unit exceeds the average consumption of 14¼ mgd. in nearby St. Louis County, with a population of 273,500. After exploratory test holes had been drilled, the wells were put down about 1,000 ft. apart alongside the Missouri River to waterbearing sand at a depth of about 100 ft. Steel casings of the wells are 52 in. in diameter at the top and 38 in. at the bottom. Individual pumps at the wells deliver water through 4,000 ft. of 16-in. and 18-in. bell-and-spigot cast-iron pipe laterals to a main leading to the treatment plant.

This main, 3,800 ft. long, includes two sections of special interest. For 300 ft. the main is laid in a 6-ft.-diam. rock tunnel excavated through solid limestone stratified in horizontal layers which eliminated need for timbering to support the tunnel roof. The tunnel is backfilled to the horizontal diameter, and both ends are bricked up to exclude cold air.

Well Points in Wet Ground

At a stream crossing on the line of the main, the trenching crew encountered a troublesome ground condition in wet, sandy silt. The soil was predrained successfully with an installation of 80 Moretrench well points to permit trench excavation in the dry. This section of the main has 242 ft. of flexible-joint pipe. The remainder of the line, with the exception of 155 ft. of concrete Lock Joint pipe, is made up of cast-iron bell-and-spigot pipe.

From the treatment plant, a 150-hp. electric-motor-driven pump delivers water to the reservoirs through a 30-in. main comprising some cast-iron pipe and more than 9,500 lin.ft. of Lock Joint precast concrete pipe. At the reservoirs, a 125-hp. motor-driven pump feeds water into the distribution mains and to the elevated tanks. The distribution mains, more than 5 mi. in length, include 4,000 ft. of cast-iron pipe in 30- to 12-in. sizes and nearly 27,000 ft. of asbestos-cement Transite pipe in 16-

(Continued on page 129)

WELL-POINT INSTALLATION of 80 Moretrench points dries up trench for main at stream crossing between wells and treatment plant.

PRESTRESSED CONCRETE TANKS of 2½-m.g. individual capacity for water storage are inspected by Lt. Col. C. R. DUTTON (left), commanding officer, and Lt. Col. CLYDE L. MILLER, area engineer. Uniformly stressed steel rods around circular walls of tanks are covered with 2 in. of Gunite.

STEEL PIPE (below) for main of second plant unit is strung along road across from stacks of asphalt-coated corrugated pipes for culverts.

Asphalt Runways SERVE SAN FRANCISCO AIRPORT

COMMERCIAL TRANSPORT PLANE is ready to take off on completed runway.

WHEN STUDIES WERE MADE RECENTLY of the most desirable methods of reconstructing and extending the paved surface of one of the runways at San Francisco airport, the final selection was a surfacing of 3-in. asphalt-penetration macadam. For part of the length the new surface was laid directly on the runway previously used. In the 200x300-ft. extension of the runway, the foundation consisted of an earth and rock fill 5 to 8 ft. deep and to provide a suitable subgrade on this fill, a 6- to 8-in. layer of crusher-run stone was put down. Two contracts for the asphaltic paving only, amounting to a total area of about 1,600,000 sq. ft., were awarded, one on May 19 and one on August 18, 1941 to Eaton & Smith. The

(Continued on page 126)

Fig. 4 . . . **AFTER WATERING,** base is thoroughly rolled with 10-ton tandem roller.

Fig. 1 . . . **CRUSHER-RUN ROCK** is spread in 6-8-in. layer and smoothed with road grader to top off surface of old fill. In foreground is base rock to support wearing surface.

Fig. 5 . . . **DISTRIBUTOR TRUCK** is here making first application of 200-300 penetration paving asphalt (SC-6) on finished rock base.

Fig. 2 . . . **SUPPLEMENTING SPREADING AND BLADING** of base course, crews of two men, with long straightedges, go over entire area, hand spotting and smoothing out surface.

Fig. 6 . . . **GEAR-DRIVEN SPREADER BOX,** Buckeye machine, has its rollers synchronized with speed of truck. It is here spreading key rock smoothly and uniformly.

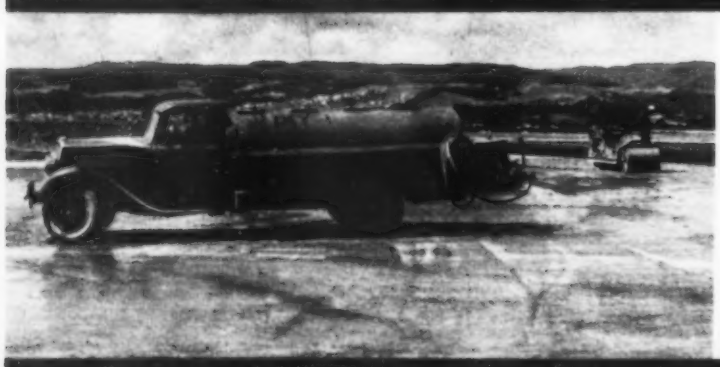


Fig. 3 . . . **BASE COURSE** is thoroughly watered and rolled to obtain maximum possible compaction.

Fig. 7 . . . **KEY ROCK IS ROLLED** to force as much as possible into interstices of coarse rock beneath.

CHANNEL SPAN of Crabbe Road bridge consists of two identical pairs of 90-ft. half-through trusses 15 ft. deep fabricated with split-ring timber connectors and shear plates.

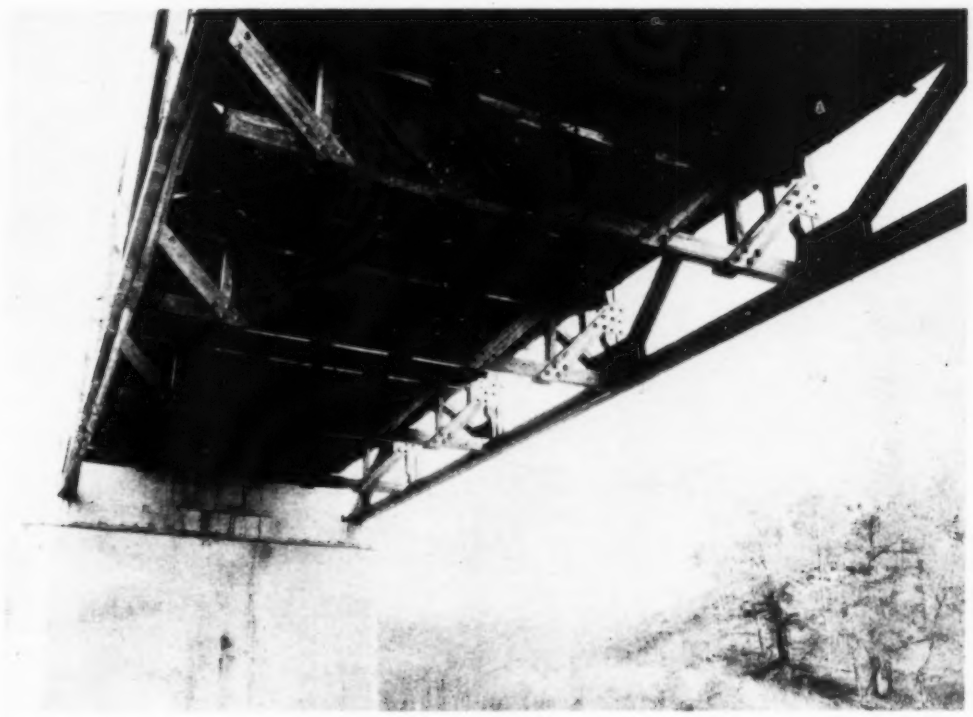
Timber Bridge

CONSERVES STEEL FOR WAR USE

INFLUENCED BY A DESIRE to conserve steel for war purposes, county officials at Tuscaloosa, Ala., specified timber construction for the new Crabbe Road bridge across the North River, recently opened to traffic. The bridge, 333½ ft. long with a 24-ft. roadway, designed for an H-15 loading, cost $43,000, including the concrete piers, or $5.36 per sq. ft. of roadway. Designed by Donald A. du Plantier, associate professor of structural engineering, University of Alabama, for fabrication by the Teco system of engineered timber construction, the bridge was fabricated and erected by WPA labor under the direction of Powell Baker, WPA engineer.

The approaches are supported by trestles of 15-ft. span, six on the south side and four on the north, with 12x12-in. trestle caps. The channel span is composed of two identical pairs of 90-ft. span, half-through trusses, 15 ft. deep. End posts are 6x14-in.; chords, 6x12 in.; diagonals, 6x8 in., and verticals, 8x10 in. with the 10-in. dimension placed transverse to the bridge axis to stiffen the top chord for half-through construction. Joints are connected by Teco 4-in. shear-plates and split-rings, flat spiked grids and single curved spiked grids. Each main truss joint has four

(Continued on page 119)



FLOOR TRUSSES of bridge have 8x12-in. chords, 6x8-in. verticals and 2x12-in. diagonals in pairs. Lateral bracing is of K type. Stringers are 6x16-in., 15-ft. span, spaced 30 in. on centers.

BRIDGE ROADWAY has 24-ft. width. Toenailed to 4x10-in. subflooring is 2x2-in. laminated gum surface flooring. All timber is creosoted. Structure cost $43,000.

To accelerate completion of badly needed road improvements in a region of great war industries, the Indiana Highway Commission added to the contract proposals for two jobs an ingenious provision which put construction time on a competitive cost basis.

BY IMPLEMENTING ITS PROPOSALS for two contracts with a special provision adding a time charge to the list of bid items, thus putting construction time on a dollars-and-cents competitive basis, the Indiana Highway Commission last year was able to provide a cash incentive for rapid completion of sorely needed defense highway work without violating laws prohibiting: (1) payment of bonuses and (2) exaction of penalties exceeding actual costs incurred by the state. By the special provision, a cash value was established for each calendar day that the state had to wait to use the completed work. Each bidder, in making out his bid, set down the number of days he would take to open the project to traffic; the time charge in the list of bid items was obtained by multiplying this number by the cash value per day. This time charge became part of the bid price.

From the amount due the contractor in final settlement of the completed contract, the state deducted the value of each day that had elapsed from the date of receipt of notice to proceed by the contractor to the date of opening the pavement to traffic. In case the work ran beyond the number of days bid in the contract, only actual costs to the state were deducted for the extra days.

Methods of bidding and construction by the successful bidders on the two jobs serve to illustrate the effect of the special provision. The contracts, embracing two adjoining sections with a total length of 11.4 mi., called for construction of a new 22-ft. reinforced-concrete roadway parallel with an existing two-lane pavement to form a divided four-lane highway capable of carrying heavy traffic generated by huge new defense industries adjacent to the route. In each contract, the highway department fixed $300 per calendar day as the value of time while waiting for the project to be opened to traffic.

One contract for almost 6 mi. of construction, involving 115,000 cu.yd. of excavation and 95,500 sq.yd. of reinforced-concrete pavement, was awarded to the Gast Construction Co., Warsaw, Ind., on a bid of slightly less than $324,000, which included a time charge of $30,000 for 100 calendar days at $300 each. Pavement on this job was opened to traffic 79 days after the contractor received notice to proceed with the work, 21 days in advance of the time bid in the contract. From the final amount due the contractor, the state deducted 79x300 = $23,700, which was $6,300 less than the amount

(Continued on page 120)

1 **27E PAVER** traveling outside forms mixes and places concrete at average rate of nearly 42½ batches per hour for 36 paving days required to complete more than 95,000 sq.yd. of reinforced pavement.

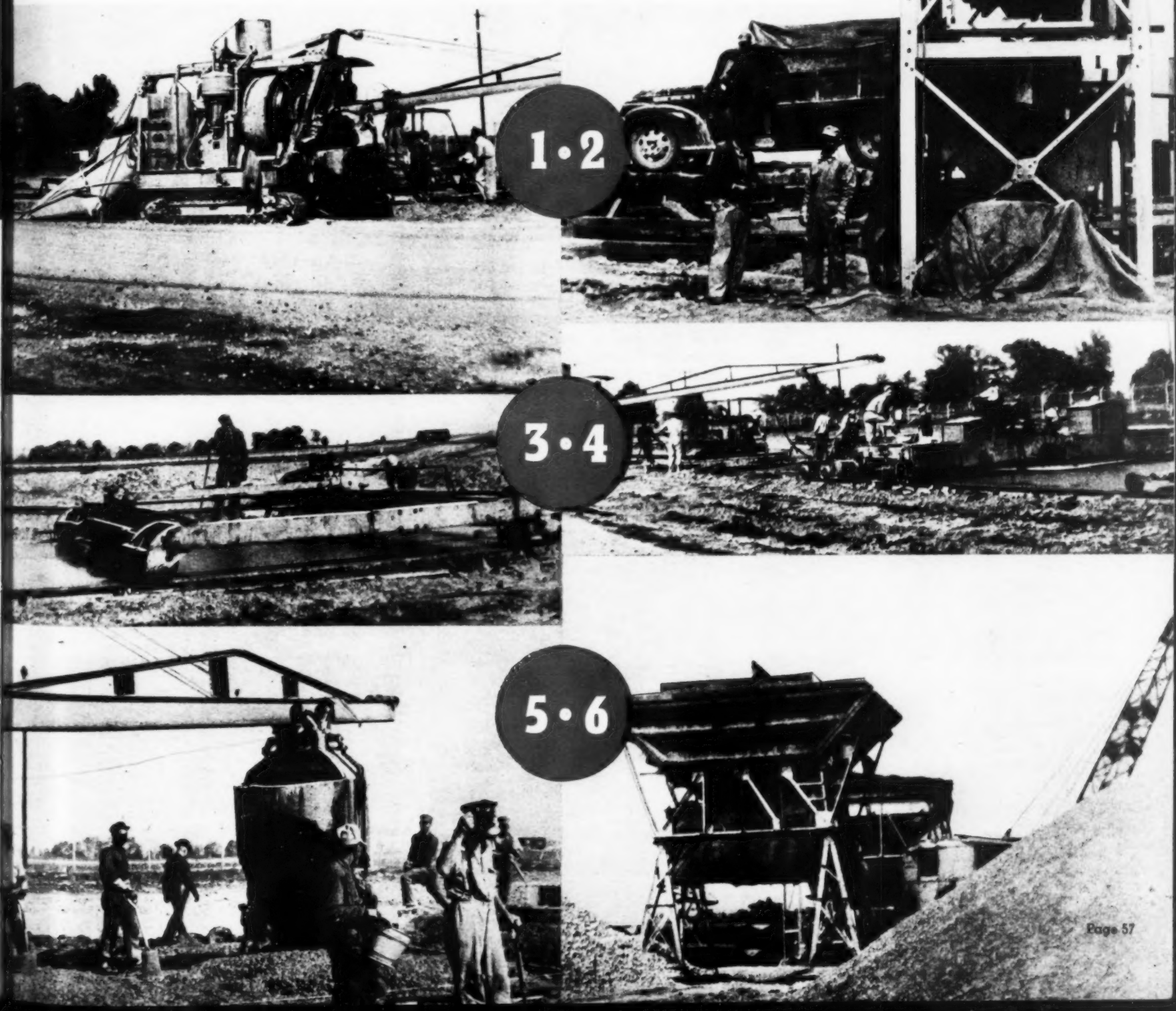
2 **BULK CEMENT** delivered in covered dump trucks from mill 6 mi. away is stored and batched by compact unit which discharges weighed batches from hopper through flexible spout into trucks.

3 **POWER-DRIVEN LONGITUDINAL FLOAT** goes over pavement surface behind finishing machine and removes any longitudinal irregularities.

4 **TANDEM-SCREED FINISHING MACHINE** strikes off top course of concrete to true cross-section profile and imparts initial mortar finish to surface of pavement.

5 **BOOM BUCKET** of paving mixer deposits concrete in second course of slab on top of reinforcement installed 2 in. below finished pavement grade.

6 **FAST CHARGING** of dry batches into batch trucks is aided by arranging three bins in line for straight drive-through by trucks. Bin in foreground has separate compartments for two sizes of stone, second bin takes care of sand, and third bin (not visible) handles bulk cement.



PLAIN EXTERIOR marks appearance of temporary buildings F, G and H located on 22nd and 23rd Sts. between C and D Sts. Lumber, interior and exterior wallboard, window and door frames, roofing and other materials are delivered to job in standard sizes to speed erection.

STANDARD PLANS provide for 2-story wood frame structures with asbestos board exterior walls, designed along severe lines for maximum

Speedy Construction

Houses Washington War Workers In Temporary Office Buildings

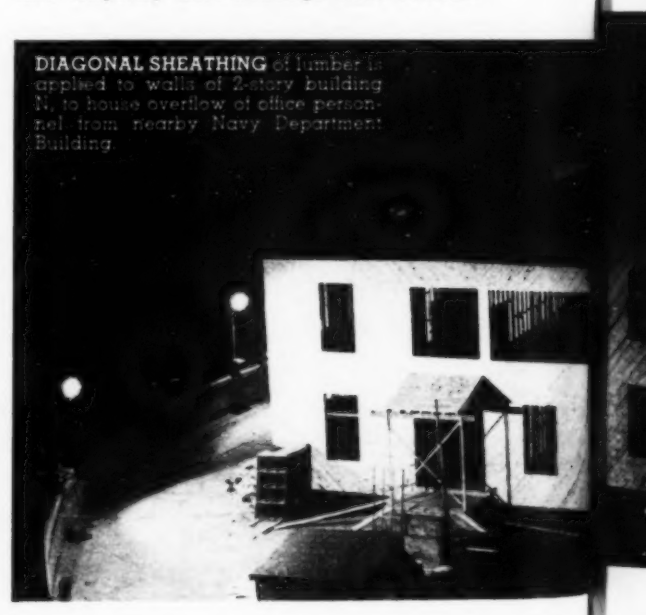
MORE TEMPORARY GOVERNMENT OFFICE BUILDINGS have already been built and occupied in the Nation's Capital than were erected during World War I. Racing to keep pace with the demand for space for federal workers, the Public Buildings Administration of the Federal Works Agency had finished thirteen buildings by Feb. 1 and had ten more scheduled for early construction.

During the years 1917 and 1918 twelve temporary office buildings were built in Washington to take care of wartime workers who, by the end of 1918, numbered 117,000. According to recent figures there are 220,000 federal workers in Washington and thousands more are expected.

PBA engineers have designed the new temporary structures on a standardized plan and along the most severe lines allowing for the greatest possible utilization of space. Construction cost per sq. ft. for buildings in the 1917-18 period and at the present time are about the same. But, all things considered, the present buildings are said to offer a

(Continued on page 126)

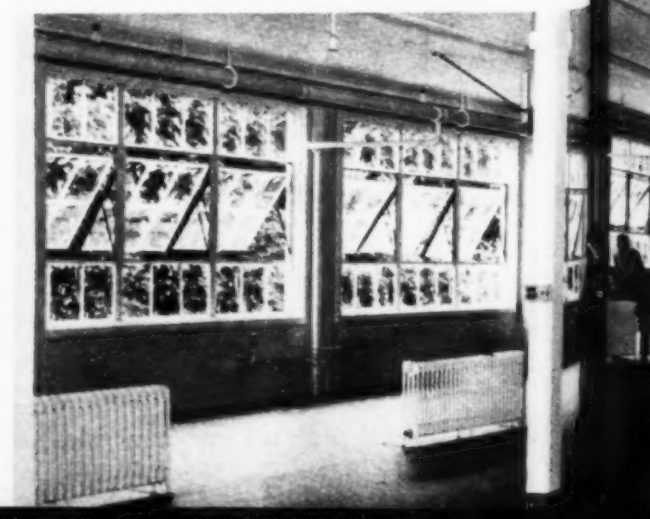
TWO-STORY DESIGN is standard for Washington's temporary office buildings. Here, structure



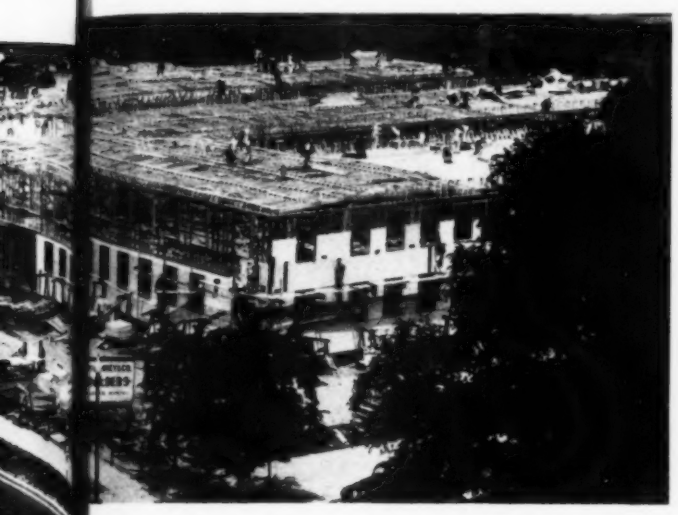
DIAGONAL SHEATHING of lumber is applied to walls of 2-story building N, to house overflow of office personnel from nearby Navy Department Building

WOOD FRAME AND FLOOR CONSTRUCTION (below) is here shown in progress on temporary buildings T and U, located in midtown Washington on Constitution Ave. between 12th and 14th Sts.

INTERIOR VIEW (below) shows maximum utilization of floor area for office space in temporary building N constructed in 47 calendar days by

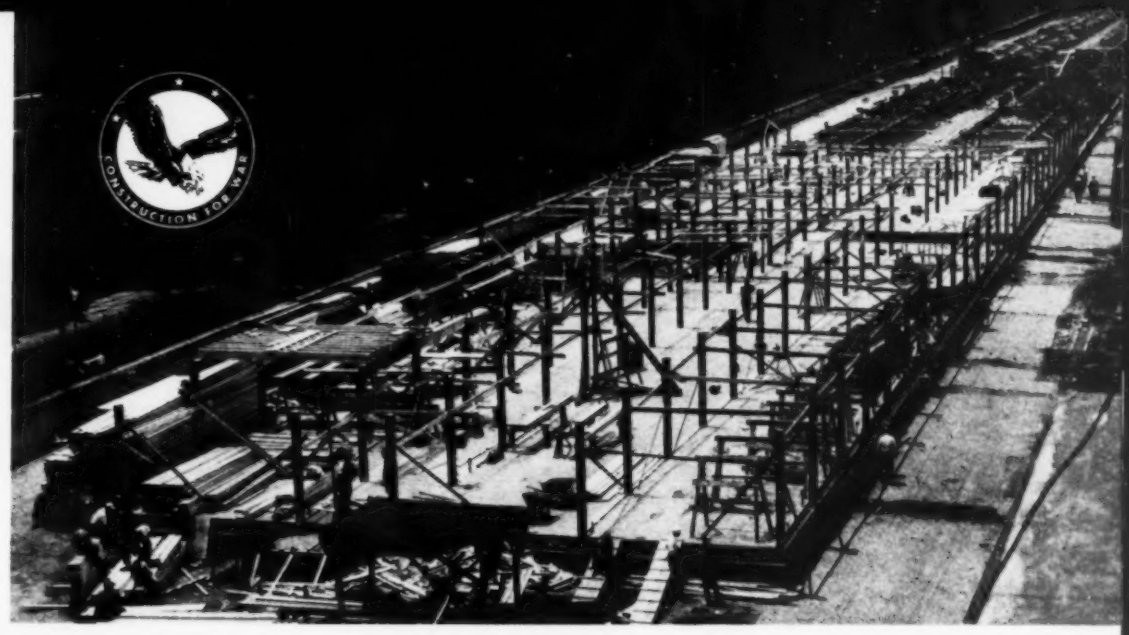


utilization of office space. View shows buildings T and U constructed by George A. Fuller Co. under direction of Public Building Administration.



D at 4th St. and Independence is being inclosed with wallboard by McCloskey & Co.

Charles H. Tompkins Co., of Washington, to form annex to Navy Department Building, which has been overcrowded since war declaration.



GROUND FLOOR is laid and columns are being erected to carry second story of temporary building N, located in back of overcrowded Navy Department Building.

Arc Welding

Saves 20 Percent of Steel for Plant Building

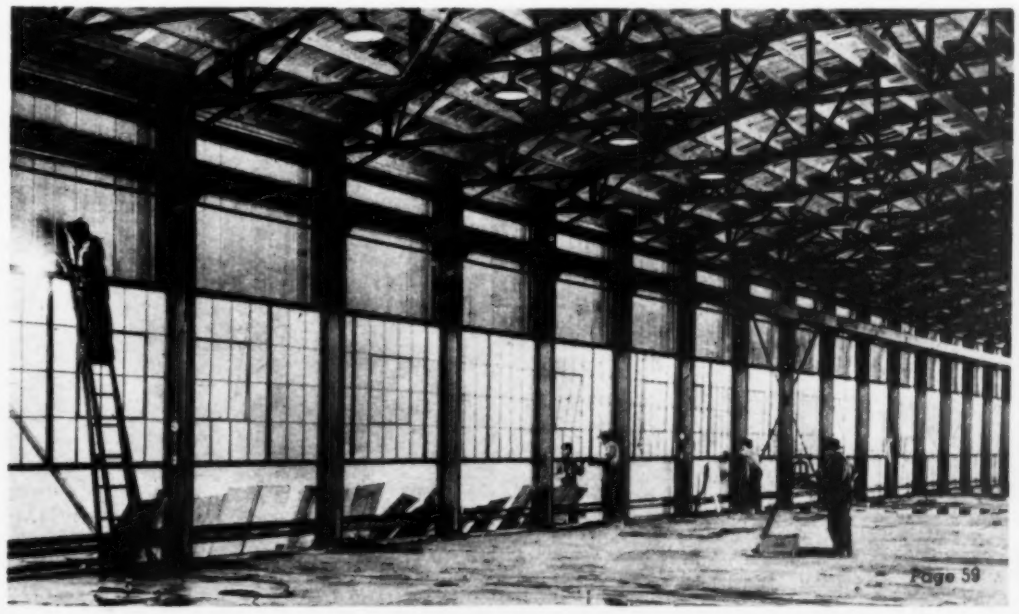
USE OF ARC WELDING for fabricating the steel framework of a factory building and an office building recently constructed for the California Cold-Rolled Steel Corp., Los Angeles, helped to save 20 percent of the steel which, it is claimed, would have been required had the frames been of riveted construction.

Two innovations are reported in regard to design and construction of these buildings. First, in-

(Continued on page 119)

FIELD WELDING OF STEEL FRAME of office building is done with alternating current machine.

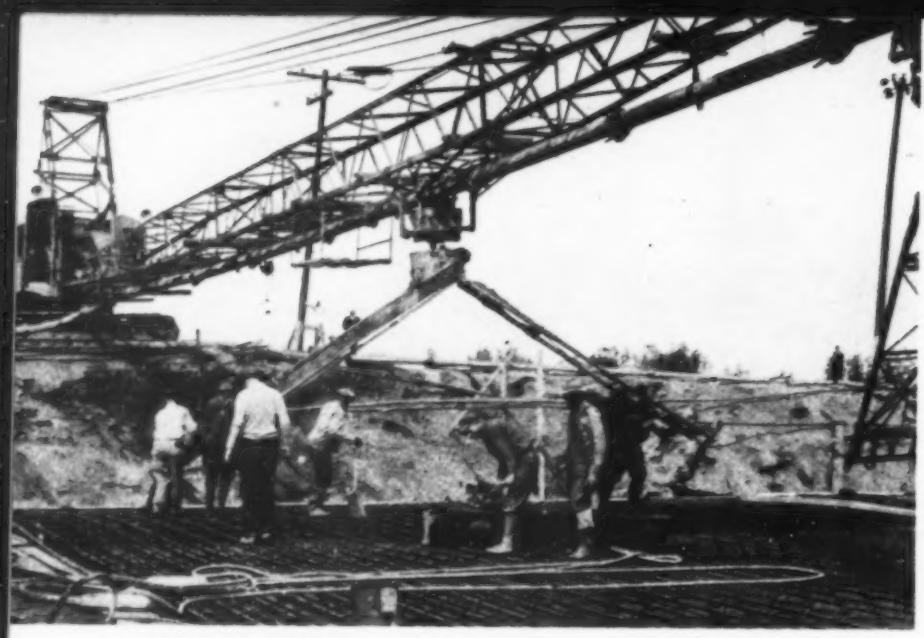
INTERIOR OF STEEL STRUCTURE (below) to house cold-rolling mill shows arc welders at work on sidewalls of structure. Columns are made up of three I-beams welded to form H-section.



HOW *They Did It*

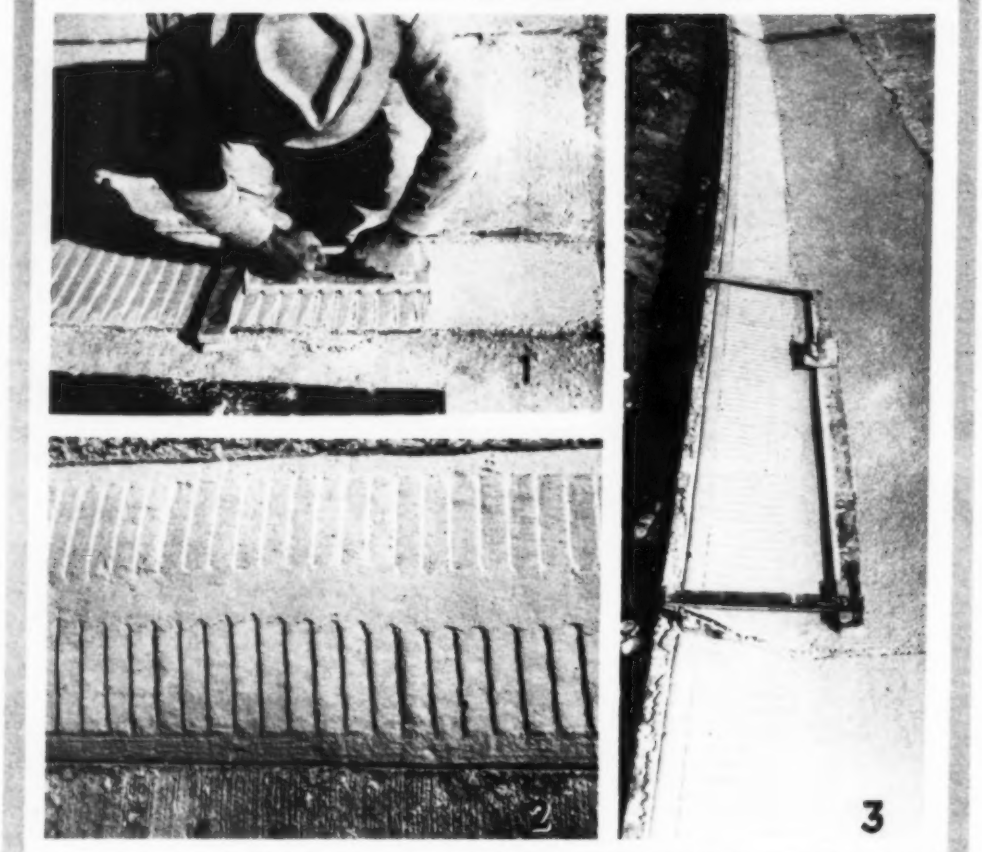
CONSTRUCTION DETAILS

For
Superintendents and Foremen

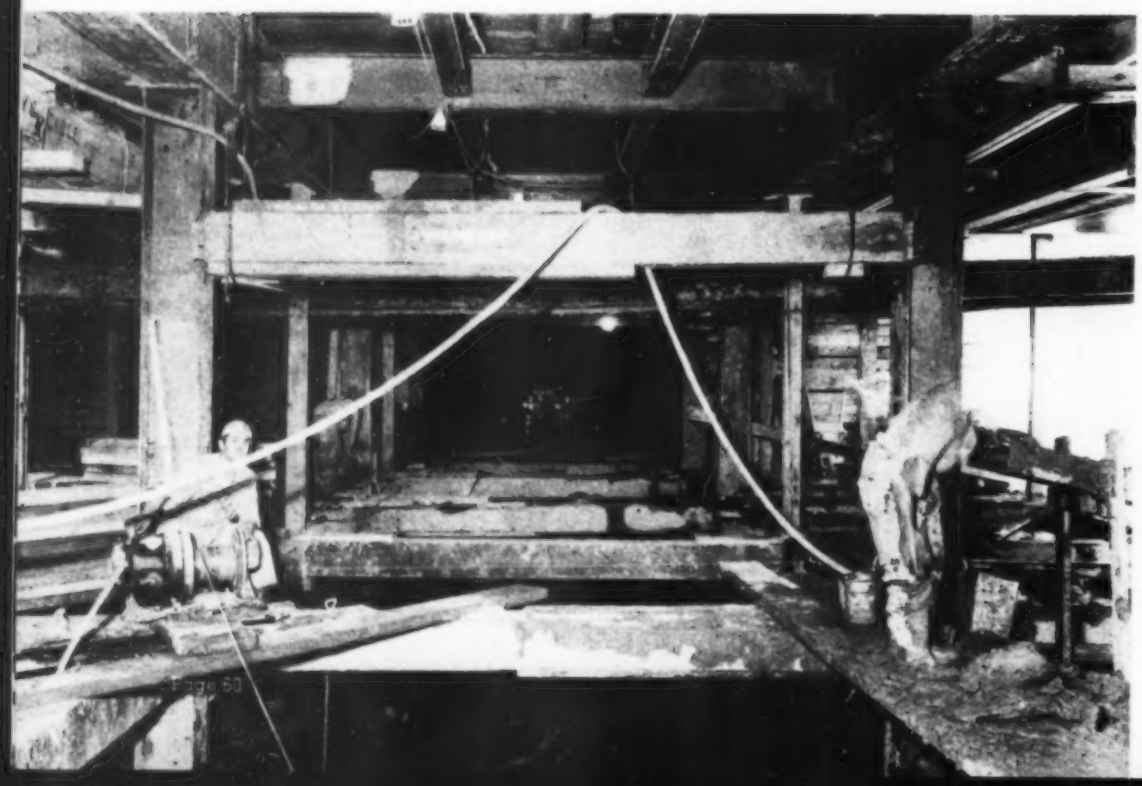


PUMPED CONCRETE is distributed to forms for dual waterway conduit in Hartford, Conn., by 8-in. pipe line carried over trench by long crane boom lowered almost to horizontal position, as illustrated. Discharge into inclined chutes is provided for at tip of boom and at point 30 ft. back from end. Contractors on U. S. Engineer Department project are B. Perini & Sons, Inc., of Framingham, Mass.

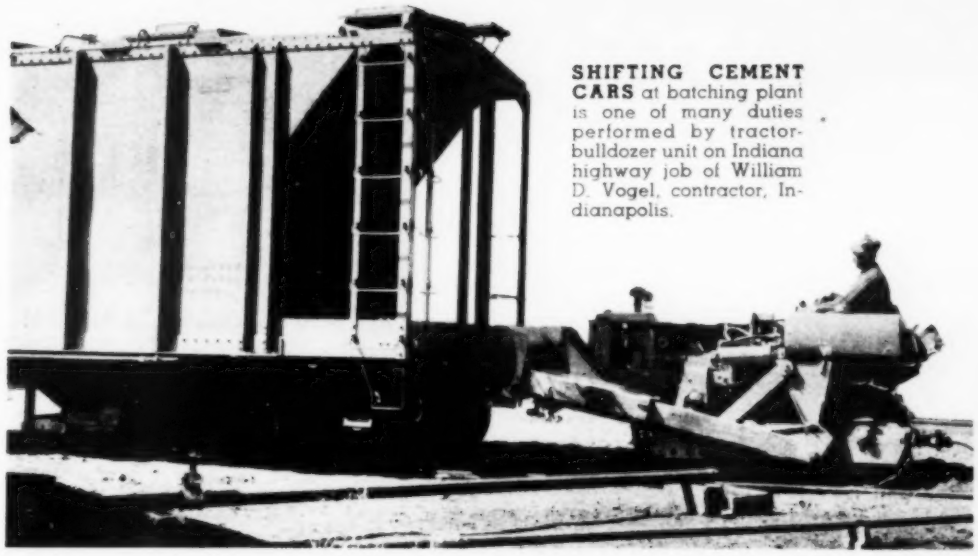
FLOAT VALVE from old paving mixer conserves water by controlling level in tank filled from Omaha city system on Nebraska highway paving job of Western Contracting Corp., Sioux City, Ia., and Peter Kiewit Sons Co., Omaha. Two triplex pumps deliver water from tank to paving outfit



CORRUGATIONS in light-reflecting surfaces of white portland cement concrete on center curb and gutter of Wisconsin highway are formed and finished with simple tools by Morris Martin Co., contractor, Berlin, Wis. Average of three strokes with molding tool **(1)** machined from flat piece of steel presses ridges in previously floated surface of curb; wooden "T" laid on pavement guides tool at proper angle to form reflecting corrugations. After being molded **(2)**, ridges on opposite sides of center curb are ready for edging and finishing. Similar surface **(3)** is formed in concrete gutter by using flat tool on slope and radius tool in rounded bottom.

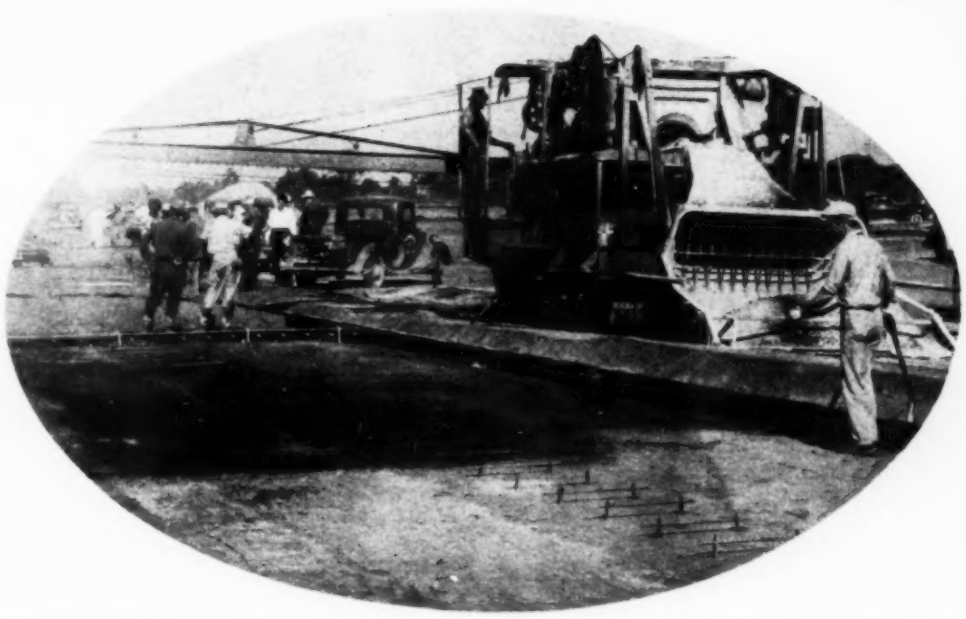


TIMBER BRACING (left) is installed between columns, driven in advance to support street decking, as excavation goes down at Monroe-Adams station built by Kenny Construction Co., contractor, on State St. subway, Chicago. Horizontal timber sheeting between vertical steel soldier beams retains sides of excavation. Air hoists operate clay knives employed in cutting blue clay.



SHIFTING CEMENT CARS at batching plant is one of many duties performed by tractor-bulldozer unit on Indiana highway job of William D. Vogel, contractor, Indianapolis.

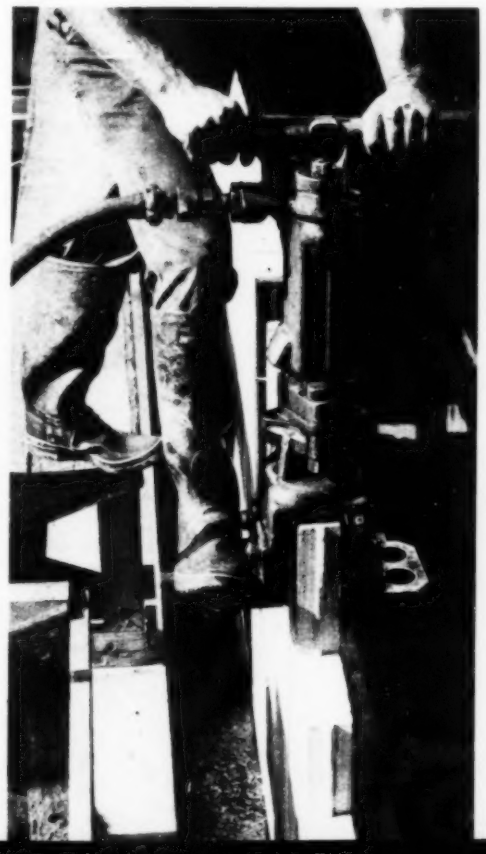
PULLED INTO CONTACT by cable running from timber crosspiece to air hoist inside sewer, 7½-ton section of concrete pipe makes tight joint fit with pipe previously laid in 84-in. drain constructed by Gargaro Co., contractor, Detroit, at Ford bomber plant, Ypsilanti, Mich. Trench is predrained with Jaeger well points.



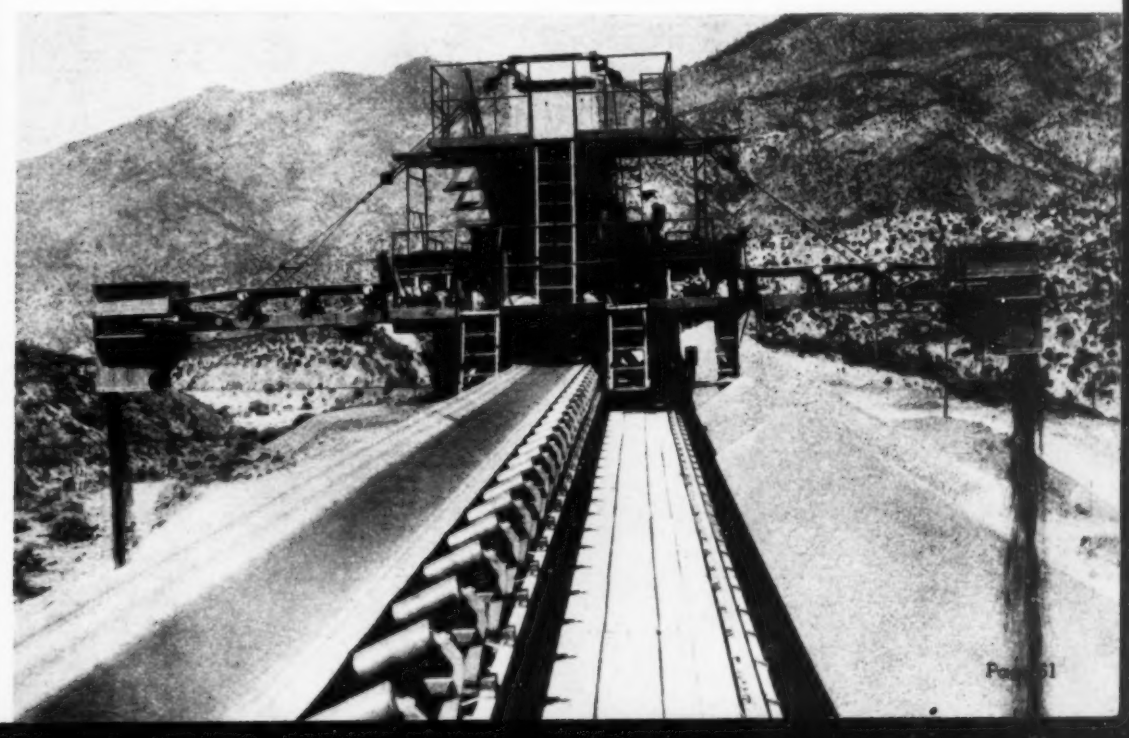
BAR GRATING in throat of skip on Ransome 34E dual-drum paver excludes foreign objects which might otherwise enter mixer placing runway concrete for Julius Porath & Son Co., Detroit, at Ford bomber plant airport, Ypsilanti, Mich.

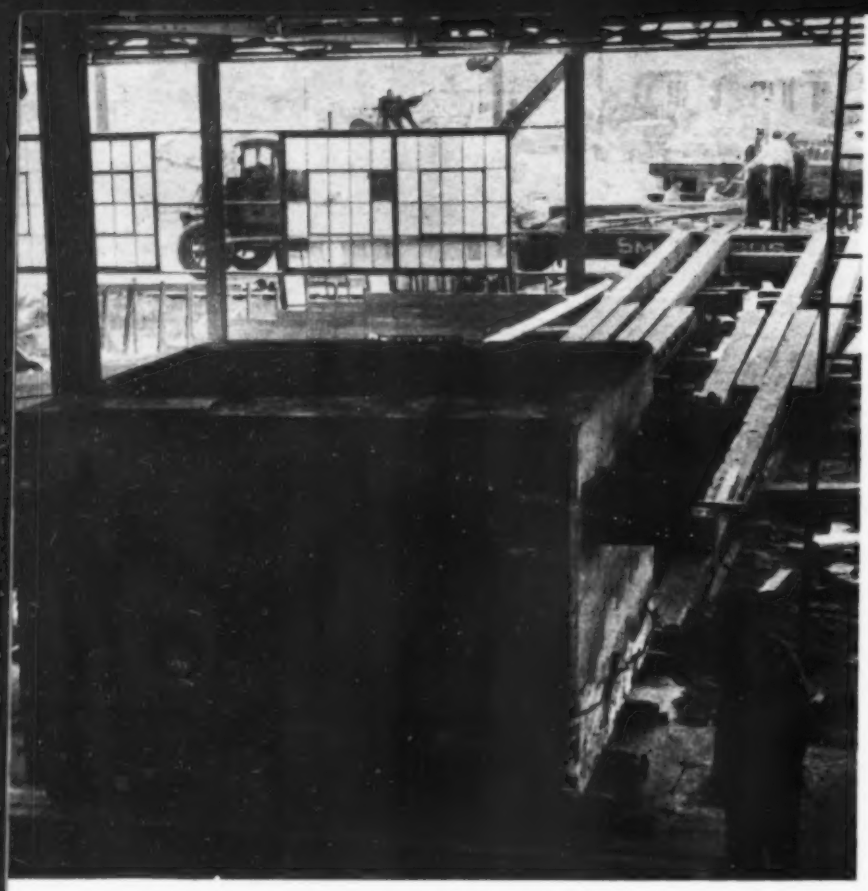
LONGER AND HARDER TEETH for shovel dipper are provided by adding 5-in. extensions of 1.040 steel butt-welded to old worn teeth with P&H Harstain 25-20 stainless steel electrode. New points are hard-surfaced by overlaying top of each tooth for 1 in. from cutting edge, as indicated by illustration, and bottom of tooth for 2 in. with stringer passes of Harcote electrode.

PILEDRIVING HEAD (below) on Ingersoll-Rand pneumatic hammer puts down t.&g. sheeting for cofferdam of Sacramento River bridge above Redding, Calif., on Southern Pacific relocation for Central Valley project of U. S. Bureau of Reclamation.



AIRPLANE TRIPPER (below) driven by three Westinghouse 10-hp. gear motors picks up aggregate from conveyor belt and delivers various sizes to respective storage piles beneath trestle for Shasta dam construction.

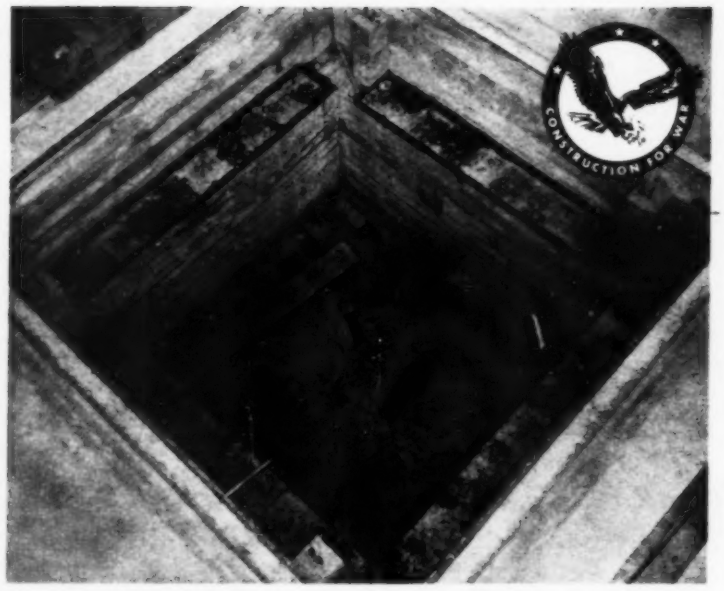




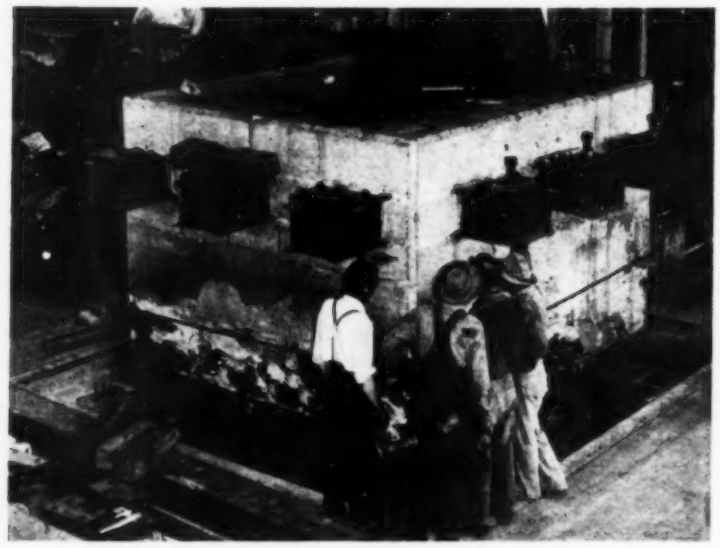
75-TON INERTIAL BLOCK on rollers has just been moved into plant addition from low-bed, heavy-duty semi-trailer truck.

Heavy Moving

Involved in Transferring 75-Ton Concrete Block at Airplane Plant



NEW FOUNDATION PIT is prepared for inertial block. Note shelf on which projecting steel beams from block will rest.



DELIVERED TO NEW LOCATION. inertial block is here supported on grillage of timbers built up in foundation pit.

NEEDLE-BEAMS (below) of 12x12-in. timbers are used as supports from which block is here being lowered to its final location by battery of 20-ton jacks.

CONTRIBUTING TO THE NATIONAL DEFENSE PROGRAM, a heavy moving job handled successfully by Smith Bros. Truck Co., Los Angeles, involved speedy removal of a 75-ton block of concrete to a new location in the plant of the Lockheed Aircraft Corp. at Burbank, Calif. The job was part of the expansion program for increasing plant capacity, including the installation of a bank of drop hammers and the heavy inertia blocks on which their impact is cushioned to prevent transmission of disturbing vibrations to nearby equipment.

A crew of ten men was required, and two crane-trucks, ten Simplex step jacks of 20-ton capacity and Roebling blue-center cables in $\frac{9}{16}$- to 1¼-in. diameters, were used in raising the inertial block from its former bed and squaring it on a track of 12x12-in. timbers. The block is 7½ ft. thick and 10x10½ ft. in plan dimensions, exclusive of the projecting steel arms which support it when in position for operation.

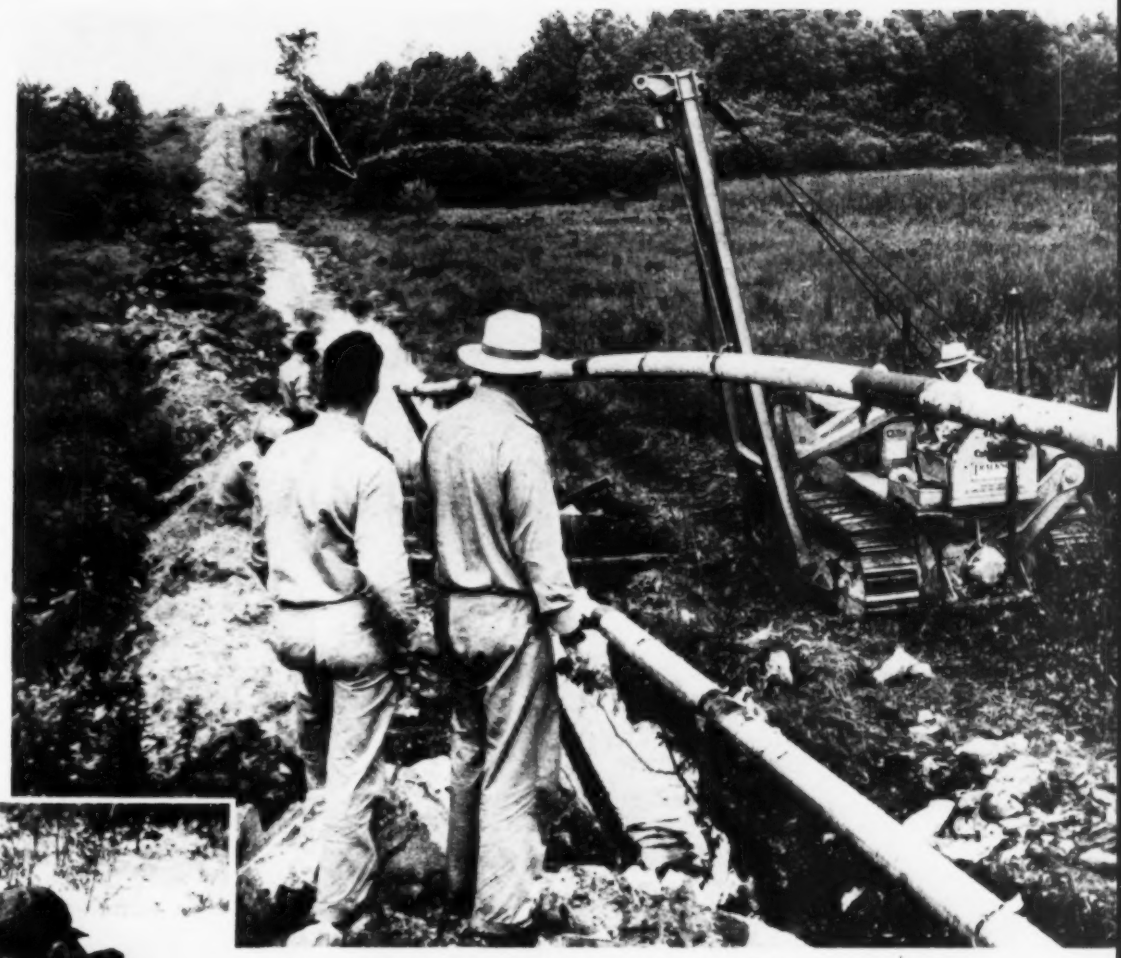
Oil Pipe Line

BUILT THROUGH 65 MILES OF DIFFICULT TERRAIN

A NEW 65-MI. WELDED STEEL PIPE LINE, designed to serve central and western Massachusetts, as well as southern parts of Vermont and New Hampshire, was opened last fall by the Shell Oil Co., Inc. Built by the Lane Construction Co., of Meriden, Conn., the new line, which transports only finished petroleum products, links the 45,000,000-gal. storage capacity of Shell's Fall River ocean terminal with the newly erected bulk plant located in West Boylston, on the outskirts of Worcester, Mass. Operating on a 24-hr. basis, the pipe line is capable of supplying nearly 400,000 gal. per day and is regarded as a highly important part of the New England defense system.

Work on the West Boylston line, which is a leg of the pipe line completed in January 1941 from Fall River to Boston, was started last April and was rushed to completion in September. The pipe used has an outside diameter of 6⅝ in. Depth of the line below ground surface ranges from a minimum of 3 ft. to a maximum of 11 ft. Rough terrain, rock formations, and swamp lands encountered along the right-of-way made the line, mile for mile, one of the most difficult yet constructed in this country, according to the engineers in charge. Between 10 and 15 mi. of the line had to be ditched and covered by hand. The Fall River pumping station, the only one on the line, is 6 ft. above see level, while the West Boylston plant is at an elevation of 565 ft. The highest point on the line is 747 ft. above sea

(Continued on page 74)



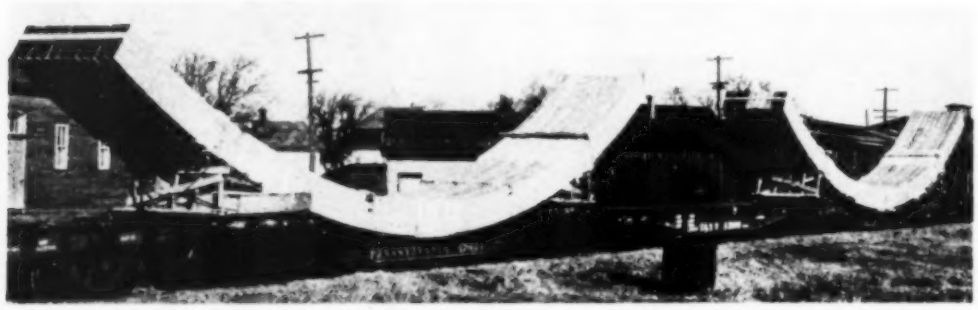
SIDE BOOMS ON TRACTORS of Lane Construction Co. place welded sections of 6⅝-in. o.d. pipe line in trench ranging in depth from 3 to 11 ft.

ARC-WELDING of joints on 65-mi. steel pipe line was done by crews of C. N. Flagg Co., of Meriden, Conn.

AT THREE RIVER CROSSINGS (below) trench for submerged pipe line was excavated by dredging with clamshell bucket. At Taunton River crossing pipe line was buried 8 to 10 ft. below streambed to provide for channel deepening project.

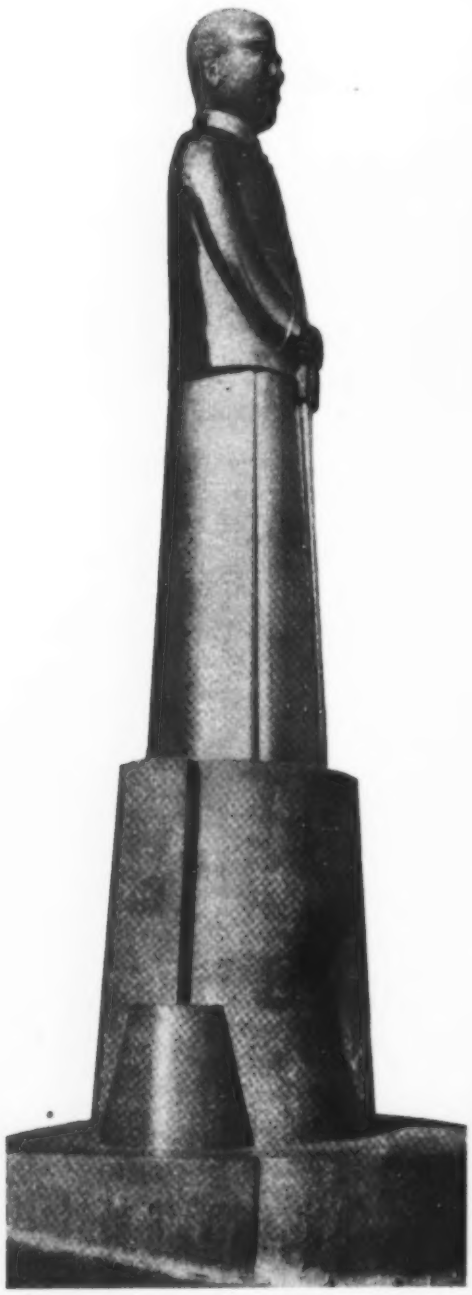
JOB oddities

ENGINEERING BACKGROUND is chosen by Apache Indians for pow-wow at U. S. Bureau of Reclamation's Coolidge Dam which supplies water to San Carlos Indian Service project in Arizona.

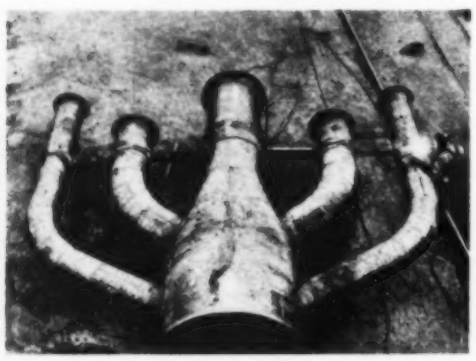


SPECIAL SHIPPING PRECAUTIONS had to be taken to deliver these glued, laminated timber trusses, 110 ft. in span, by rail from Peshtigo, Wis., to Newport, R. I., where they are used in constructing a drill hall. Manufacturer, Unit Structures, Inc., had to obtain depressed center cars to carry trusses and idler cars between to provide for overhang.

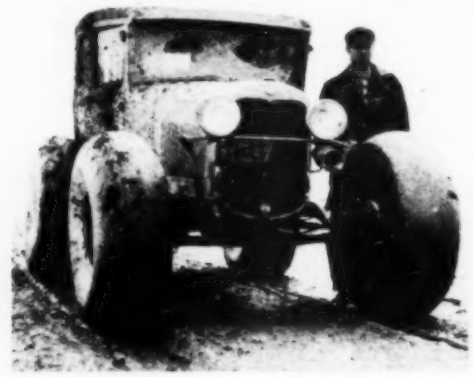
FOR DEFENSE AGAINST FROST. Julius Porath & Son Co., contractor, Detroit, builds this pyramid of baled straw to cover any concrete slab laid in cold weather on 723,000-sq. yd. paving job for airport of Ford bomber plant, Ypsilanti, Mich.



ALL-WELDED STEEL STATUE of Sun Yat Sen, first president of Chinese Republic, is one of metal sculptures of Beniamino Bufano, of San Francisco, and stands in small park of San Francisco's Chinatown. In welding metal statues, according to Hobart Bros. Co., makers of equipment for this purpose, extreme caution must be exercised when restarting arc after changing rods, as crater holes or excessive beads would spoil beauty of finished work of art.

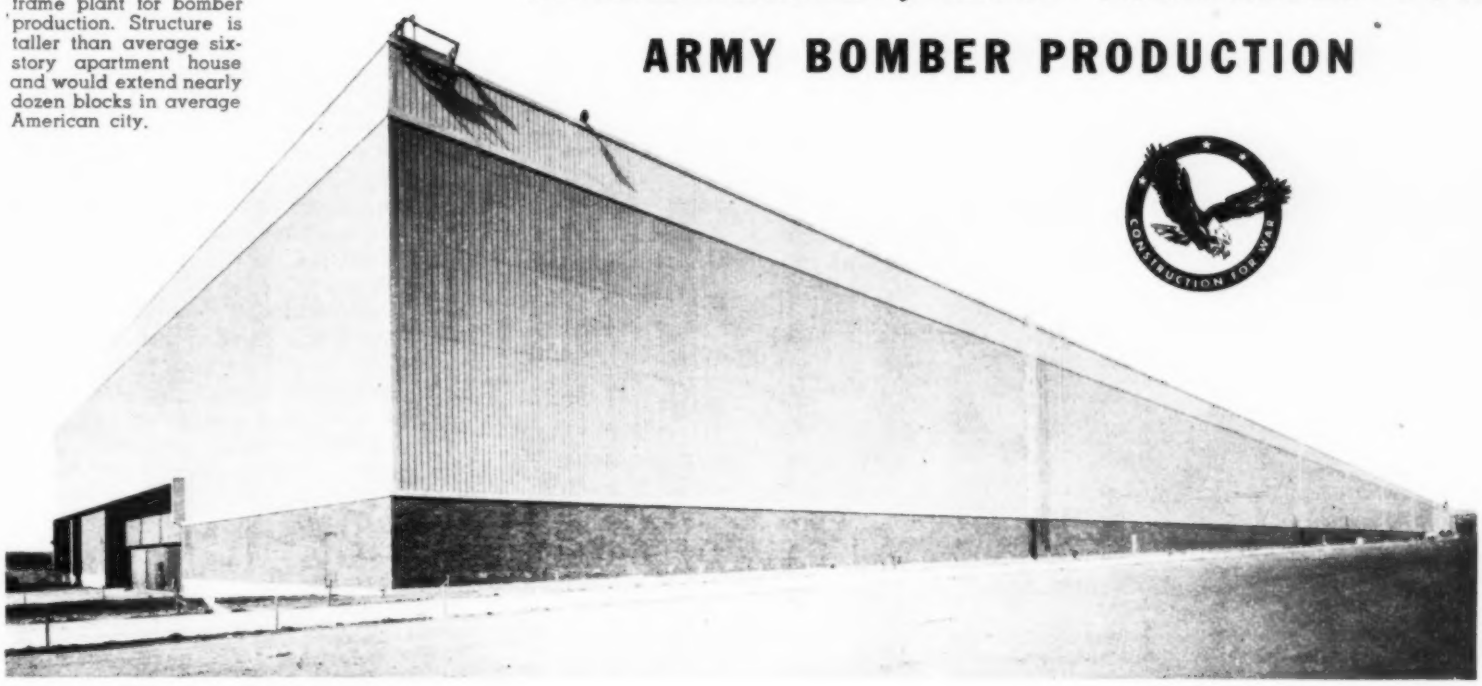


"DOODLEBUG" OUTLET MANIFOLD of odd shape is produced by arc-welding joints with Lincoln equipment at Sunshine Reservoir, Meeteese, Wyo. Connection provides outlets from 72-in. pipe of (left to right) 18, 24, 36, 24 and 18 in. diameters. Wall thickness of pipe is 7/16 and 3/8 in.



USED AIRPLANE TIRES ON FLIVVER enable Perkins Battles, rural mail carrier, of Randolph, Vt., to make deliveries in spite of deep snow or mud. Tires that had outlived service on transport plane have cross-section width of 17 in. and are fitted on a 16-in. wheel, according to B. F. Goodrich Co.

Windowless Plant COMPLETED FOR ARMY BOMBER PRODUCTION



SOLID WALLS of steel and fiberglas inclose huge air-conditioned steel-frame plant for bomber production. Structure is taller than average six-story apartment house and would extend nearly dozen blocks in average American city.

MORE THAN 8,000 TEXANS received merit award citations from The Austin Co. March 16 in recognition of their part in speeding completion of a large windowless bomber plant, designed and built by Austin for the production of Army bombers. (See *Construction Methods*, December, 1941, p. 50.) The plant construction was started April 18, 1941.

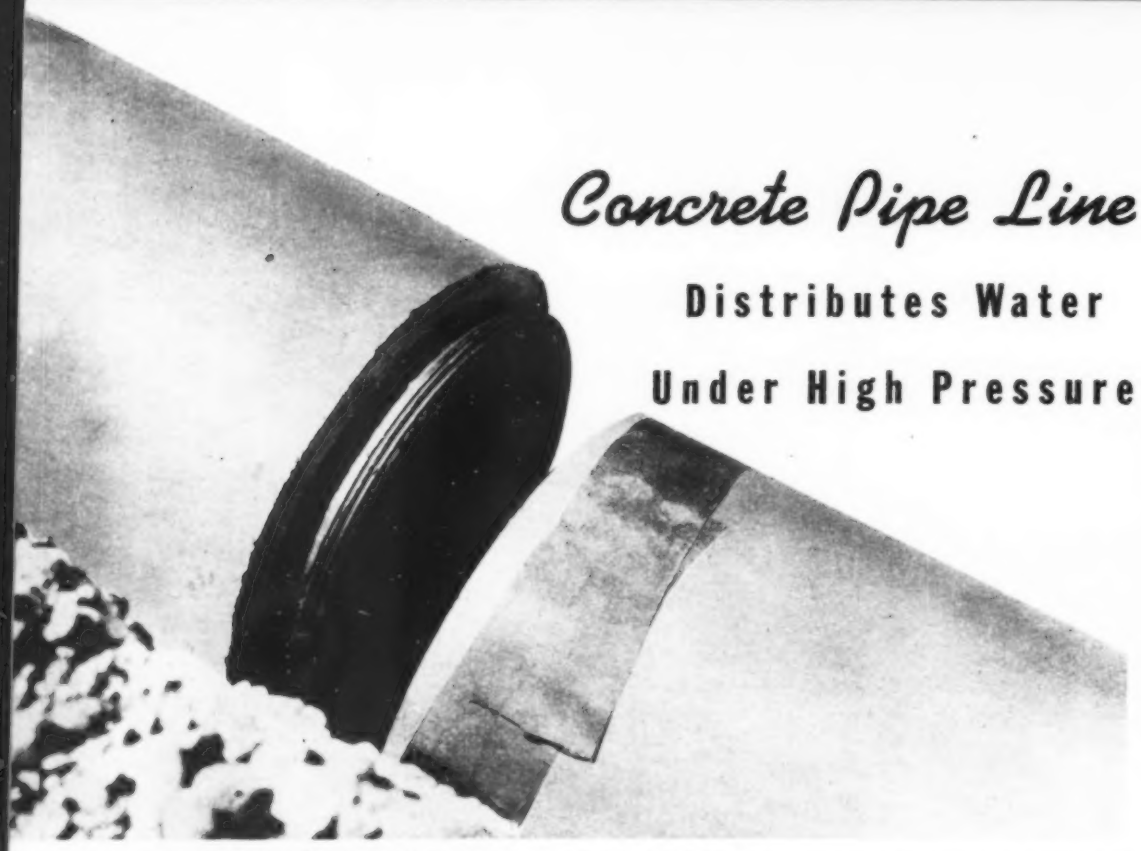
The awards went to common laborers, truck drivers and skilled building tradesmen, as well as to the hundreds of engineers and superintendents who designed and supervised the job. Among them were men in every trade, many recruited from nearby and distant states to man the staff which exhausted local labor resources in several fields.

Built of fiberglas and steel to provide maximum safety, automatic blackout protection, economical air conditioning and the best obtainable working conditions, this plant and an identical structure several hundred miles away are the two largest air-conditioned buildings in

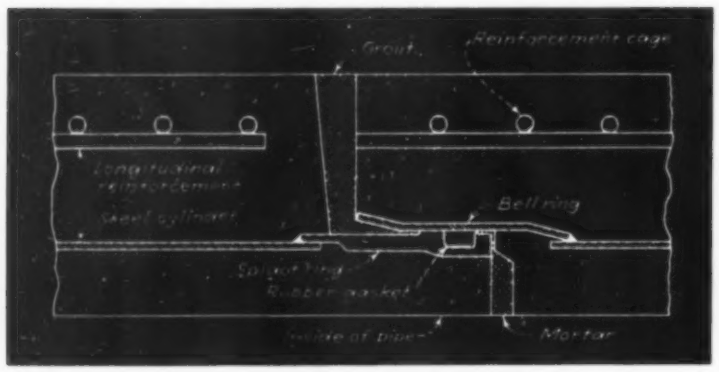
(Continued on page 133)

LIGHT-REFLECTING FLOOR with white cement surface is feature of main assembly bay. Working area with 40-ft. vertical clearance is equipped with fluorescent lighting units hung from steel roof trusses.

Concrete Pipe Line Distributes Water Under High Pressure



READY FOR TELESCOPING are bell and spigot ends of adjoining pipe sections. Groove in spigot ring carries rubber gasket. Joint is sealed with mortar on inside.



DETAILS OF PIPE JOINT, showing steel cylinder and rod reinforcement encased in concrete. Rubber gasket and mortar filler prevent leakage.

AN INCREASE IN THE POPULATION of San Diego, Calif., from 200,000 to 275,000 in less than 12 months' time, resulting from a large-scale expansion of defense agencies and industries in that city, necessitated the construction of a 24,000-ft. water supply pipe line to serve a mass housing project to 30,000 defense workers at Linda Vista, in addition to enlarged aircraft manufacturing plants and other housing units in the vicinity of a naval training station. Alternate bids for the project, known as the Mission Valley water supply line, were called on 24-in. cement-lined cast-iron pipe with cement calked joints and on 24-in. reinforced concrete cylinder pipe with rubber gasket joints. The pipe had to withstand operating pressures of from 100 to 200 lb. per sq.in., with the major portion under the higher pressure.

Contract for furnishing and installing the 24-in. reinforced concrete pipe was awarded April 22, 1941 to the American Concrete & Steel Pipe Co. which, despite difficulties in obtaining steel sheets and reinforcing rods, began manufacturing operations early in June and field installation one month later. Construction was completed Aug. 14, in time to serve the newly arrived occupants of the Linda Vista housing project. Details of the pipe joint and steel reinforcement are shown in sketch herewith.

About 18,000 ft. of the line runs along the floor of Mission Valley, where the operating pressure is nearly 200 lb. per sq.in. On this section test pressures of 232 lb. per sq. in. were applied, with leakage well below specification requirements. Construction of the line, located for the most part along suburban streets, involved standard methods and equip-

(Continued on page 76)

TRUCK-CRANE (below) lowers 36-in. pipe section into trench on Upas St. line. Similar methods and equipment were used on main Mission Valley line, where pipe diameter was 24 in.

PIPE LAYING AND JOINTING (below) followed close behind trenching machine and truck-crane, shown in background.

Sheetpile Driving

Aided by Guide Frame And Slotted Plates on Hammer

FOR DRIVING 65-FT. LENGTHS of steel sheetpiling to form a watertight cutoff for closure of the cofferdam at Neversink Dam, under construction for the New York Board of Water Supply as part of the new Delaware River supply system, George M. Brewster & Son, Inc., contractor, employed a truck-mounted Lorain crane with 80-ft. boom and a No. 7 McKiernan-Terry pile hammer fitted with slotted sheet steel guides, as illustrated herewith, so that two lengths of piling could be driven simultaneously. As reported by Michael A. Kitizin, engineering inspector for the Board of Water Supply, the contractor was required to drive the piling to a depth of 17 ft. below the bottom of the rolled embankment.

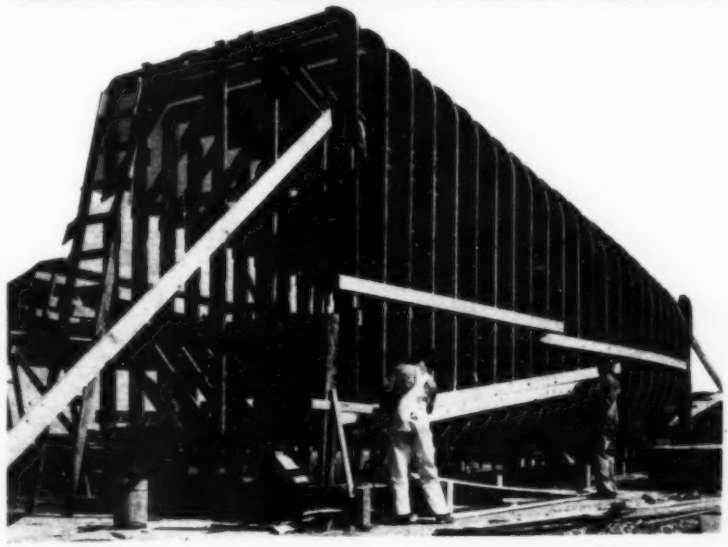
A feature of the placing and driving of the piling was a guide frame of 12x12-in. timbers with bolted connections, 32 ft. high and 30 ft. long, designed to support 22 sheetpile units. As the 80-ft. crane boom was of insufficient length to enable the interlock to be made between two adjacent 65-ft.

(Continued on page 133)

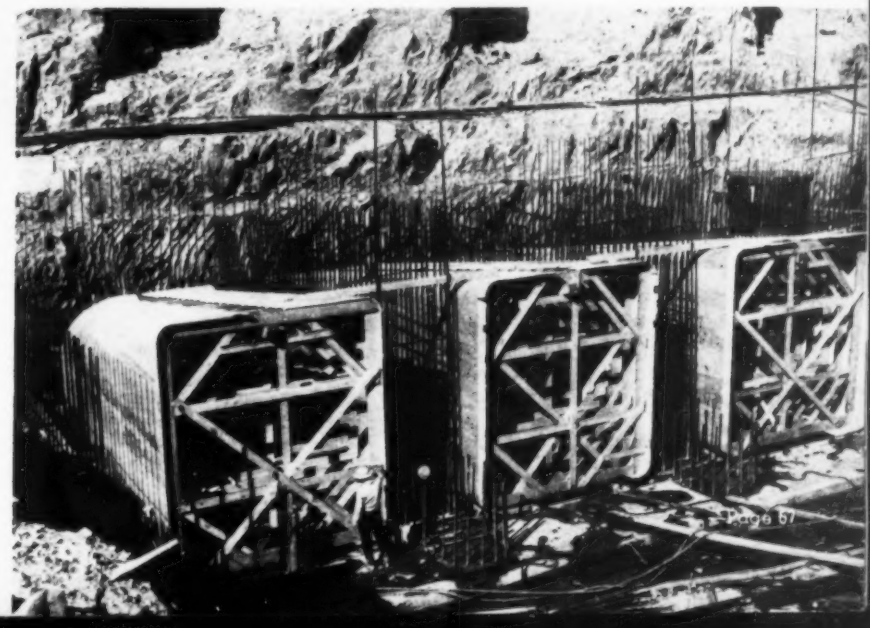
SETTING OF 65-FT. PILES accurately to line for driving is aided by use of timber guide frame 32 ft. high and 30 ft. long. Frame holds 22 pile units which are placed by Lorain truck-crane with 80-ft. boom. Worker atop piling maneuvers hammer with slotted guides into position for driving two piles simultaneously.

SLOTTED GUIDES in ¾-in. steel sheets welded to sides of pile hammer enable two units of piling to be driven simultaneously

Huge Forms FOR SHASTA DRAFT TUBES



THE ACCOMPANYING PHOTOGRAPHS show stages in the fabrication, transport and installation by Pacific Constructors, Inc., of the huge wood forms for the draft tubes at Shasta Dam, U.S. Bureau of Reclamation project in California. Immense size of forms is indicated by comparative height of men working on them.



GO TO IT

...and don't spare the whip

OFFENSE

A big gun is hurriedly moved by a powerful 2-cycle Diesel tractor.

POWER

Model M, gas tractor, stringing high tension cable in Washington.

ROADS

Model HD-7, 2-cycle Diesel tractor 'dozing' a road through an army camp in North Carolina.

THESE MACHINES CAN TAKE IT!

Back of America's vast striking power are the countless huge plants that produce the tanks, guns, ships, planes and supplies of all kinds ... the immense network of power lines that keep them going at full production ... the thousands of miles of strategic roads that quickly move men and materials. A tremendous task ... laying the groundwork for these lifelines of freedom! But a job that must be done ... and is being done ... fast! More than doing their part ... on the big, important, time-limit projects ... are Allis-Chalmers machines of all types. Wherever things are moving fast and the word is "go to it ... get it done" ... you'll find them—find them breaking records ... find them making dirt-moving history ... and doing it without babying or pampering.

CONSTR UCTION

Model M and Hough Shovel used by army engineers on road construction.

AIR-PORTS

Model HD-14 pulling, HD-10 pushing, on 2,000,000 yd. airport job in Alabama.

Model HD-14, buildi... cant...nment

ALLIS

TRACTOR

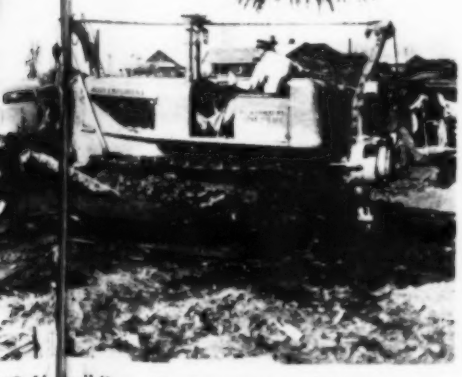
INVEST

TAMERICA!

"AD" Motor Grader leveling for the huge war office building, Arlington, Virginia.

BUILDINGS

CANTON-MENTS



HD-14, building U. S. army airport cantonment in Oregon.

DEFENSE

Model M refueling a plane at Malta.

ALL OUT FOR VICTORY!

This task of building a strong America rests with the construction men of the nation. They are going at the job with incomparable vigor . . . ceaselessly giving all that they, their crews and machines are capable of giving . . day and night. We are thankful we can help by giving them the best possible tools . . . in as large a quantity as our huge plants . . . working at top speed . . . are capable of producing.

LLIS-CHALMERS

TRACTOR DIVISION · MILWAUKEE · U. S. A.

Power for Victory

INVEST IN THE FUTURE OF AMERICA . . . BUY DEFENSE BONDS AND STAMPS

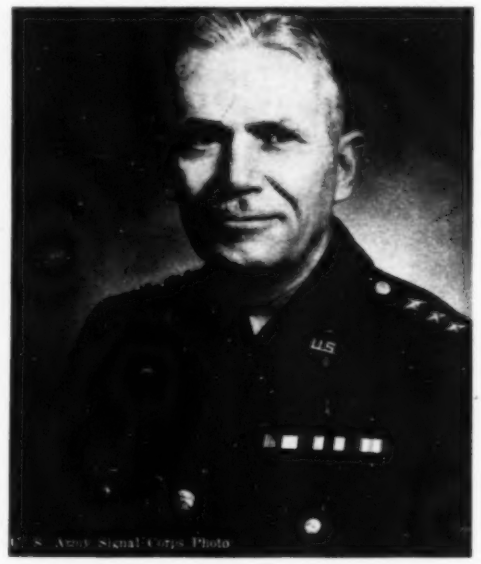
Present and Accounted For — A PAGE OF PERSONALITIES

U. S. NAVY'S PUBLIC WORKS PENNANT is awarded Feb. 17 to O. W. BURKE (left) president of O. W. Burke Co., Detroit contractor, for efficiency and speed in constructing hangar and office building at Grosse Ile naval reserve aviation base near Detroit. On behalf of Bureau of Yards and Docks presentation is made by Lt. Comdr. R. C. Young, as Captain R. T. Brodhead, commander of Detroit Naval District, looks on.

NATIONAL HOUSING AGENCY, in which all house-building and financing agencies of federal government have been consolidated by recent order of the President, is headed by JOHN B. BLANDFORD, former general manager of Tennessee Valley Authority and assistant director, Bureau of Budget. NHA is independent of Federal Works Agency and will handle construction of slum clearance and war housing, formerly scattered among nine agencies.

NEW OFFICERS of Associated General Contractors of America are DANIEL W. KIMBALL (left) president, and head of Owen-Ames-Kimball Co., Grand Rapids, Mich., and OSCAR B. COBLENTZ, vice-president, and president of McLean Contracting Co., Baltimore, Md.

HEADING ARMY'S SUPPLY SERVICE (below) in recent drastic reorganization establishing three major commands over ground forces, air forces and supply, is LIEUT. GENERAL BREHON B. SOMERVELL, Corps of Engineers officer who has served in many important capacities, including Assistant Chief of Staff, G-4; head of Construction Division of Quartermaster Department; Works Progress Administrator for City of New York; and in charge of Construction of Florida Ship Canal.



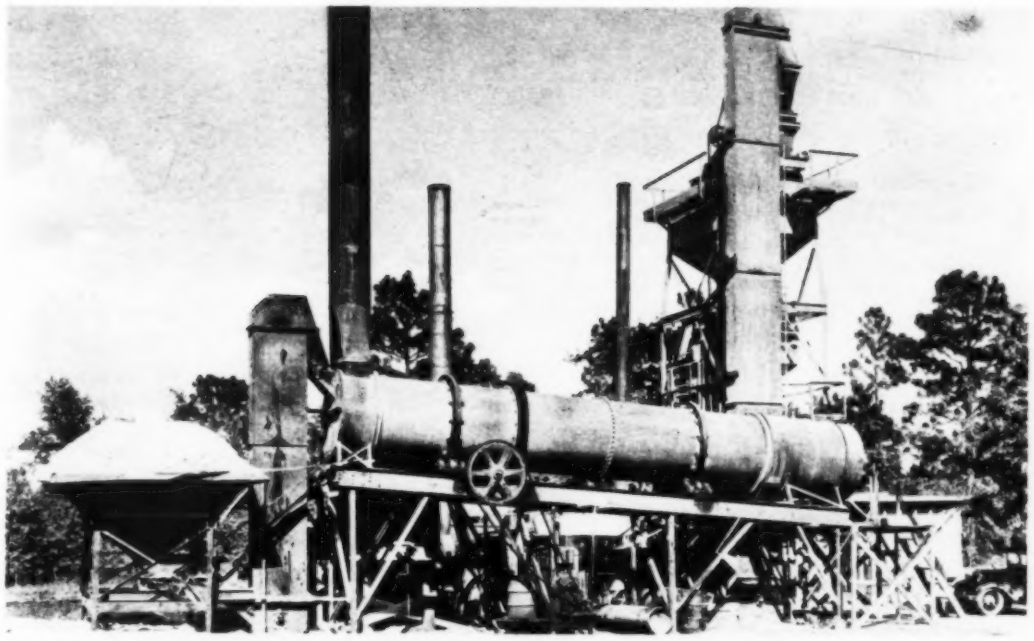
U. S. Army Signal Corps Photo

NEW CHIEF ENGINEER (left) of Illinois State Division of Highways, filling vacancy created by resignation of Ernst Lieberman, is WESLEY W. POLK, former commissioner of public works and city engineer of Evanston, Ill. He is a graduate of University of Illinois and held post of service superintendent of Chicago's Union Stock Yards.

AMERICAN ROAD BUILDERS' ASSOCIATION has selected as its new president CHRIS. J. SHERLOCK **(right),** State Highway Director of Alabama, who was installed in office during association's annual convention in Memphis, Tenn., last month. Mr. Sherlock has served in Alabama Highway Department since 1922, starting as computer and draftsman and working up through various engineering grades to chief engineer. He resigned recently from his post as highway director to become a candidate for Governor of Alabama.

16 Portable Asphalt Plants

PROVIDE HOT MIX FOR ROAD JOBS



PORTABLE ASPHALT PLANT. 100-ton capacity, operates hot-sand elevator vibrating screen, rotary drum, air compressor and deep-well pump.

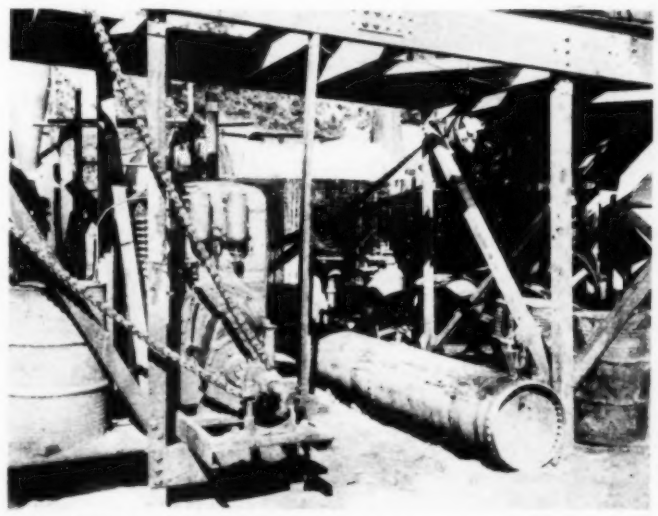
SIXTEEN LARGE-CAPACITY PORTABLE ASPHALT PLANTS are being used by Sam E. Finley, road-building contractor of Atlanta, Ga., to provide hot mix and speed work on his many contracts in various parts of the Southeast. The plants are operated by internal-combustion engines. Because of fuel economies, Mr. Finley more recently has been employing diesel engines.

The plant shown has a capacity of 100 tons per hour and was used to provide mix for surfacing on State Route No. 1 between Bainbridge and Colquitt in southwestern Georgia. It was operated by an International 6-cylinder diesel and an International 4-cylinder diesel power unit, maximum horsepower of these being respectively 100 and 62.5.

The larger power unit operated the hot-sand elevator, vibrating screen, rotary drum, 5½x5-in. air-compressor and deep-well pump. The smaller one operated the rotating sand-drying drum and horizontal sand conveyor under hopper and elevator for raising sand to drum.

Two types of mix were made, one for 3-in. base, consisting of 7 per cent asphalt and 93 per cent sand, which was taken from a nearby pit. The other mix for 2-in. sheet top consisted of 9½ to 10 per cent asphalt, 10 per cent mineral filler, and 80 per cent sand.

Sand was delivered to the 30-ton hopper at left by a clamshell bucket. From below the hopper, sand was conveyed by moving platform to the sand elevator and thence to the rotating drying drum which is 42 ft. long and has an inside diameter of 90 in. Blades inside the drum continually agitate the sand. Heat was provided by two oil burners. From this big drying drum the sand went to a vibrating screen and then was elevated according to size to a multiple compartment storage bin. After being weighed, the sand was delivered as needed into an 8-ton mixing drum. Asphalt was stored in three tanks, each of 10,000-gal. capacity. When taken from these storage tanks, it was heated in a 1,000-gal. steam-jacketed kettle.



TWO DIESEL ENGINES. 6- and 4-cylinder units, provide 100 and 62.5 maximum horsepower for operation of 100-ton capacity asphalt plant.

It is common practice for Mr. Finley's men to knock down a big asphalt mixing plant such as that shown, move it to a new locality 100 mi. or more away by motor truck, set it up and put it in operation again in less than two weeks.

★ ★ ★

Adjustable Machine

FACILITATES

Radius Bending

OF HEAVY BARS

ACCURATE BENDING IN PERFECT ARCS of reinforcing bars up to 1¼ in. square at a speed of 40 ft. per minute is possible with a compact machine recently shipped to the contractor on a large Navy project. For this job, the contractor and the Navy Department wanted a combination machine which would bend large bars in true arcs of varied radii and smaller rods in continuous spirals of different diameters. A spiral bending attachment on the machine takes rods of ¼- to ⅝-in. size and forms

(Continued on page 72)

RADIUS BENDING of heavy bar is accomplished at speed of 40 ft. per minute by machine equipped with two power rolls and adjustable idler roll which may be set by side control lever to produce arc of any desired radius from 9 in. to infinity.

To prevent scouring and undermining ARMCO *sheeting was driven into the streambed 30 inches from the abutment face. J-bolts anchored the sheeting and a firm footing was provided by cleaning and filling the open space with concrete.*

• When scouring or undermining weakens bridge abutments here is a helpful hint: Use ARMCO Sheeting to assure a firm footing, reduce maintenance and protect the bridge structure.

Then you will have the same advantages that make ARMCO Sheeting ideal for trench work, cofferdams, cut-off walls, foundations and bulkheads. The corrugated metal design provides ample strength without excessive weight, which means quick, easy handling. It drives fast because of the small displacement area and smooth surfaces. On temporary jobs you can pull ARMCO Sheeting again and again for thrifty re-use. Individual units nest snugly together for space-saving in storage or transit.

An ARMCO Sheeting is supplied for every purpose —Flange Type, Clip-Type and Interlocking. Write for complete information and prices. ARMCO DRAINAGE PRODUCTS ASSN., 115 Curtis St., Middletown, O.

ARMCO SHEETING

(Continued from page 71)

them into continuous spirals at high speed.

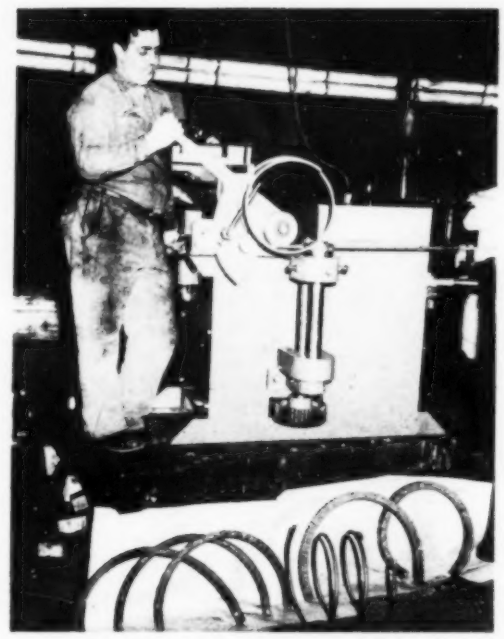
As designed and manufactured by A. Klingelhofer, Inc., New York City, the bending machine is a rectangular, 1,800-lb. unit measuring about 4 ft. in its greatest dimension. The machine is equipped with power-driven rolls for continuous bending of bars of any length, power being supplied by a 5-hp. electric gear-head motor.

For radius bending of bars, the table-top of the machine is equipped with two vertical driven rolls and an idler roll. The latter roll is eccentrically mounted to permit selective setting by a control lever for bending arcs of varying radii ranging from 9 in. to infinity. Changes in setting of the idler roll are readily made by the horizontal control lever, which is anchored securely in any desired position by an adjustable hook inserted into the proper hole on a horizontal plate. As indicated by an accompanying photograph, a curved row of holes in the plate facilitates selective setting of the idler roll.

As built for the Navy project, the machine can bend bars from ⅝- to 1¼-in. size. By increasing the power and changing the driven rolls, the same type of machine can be constructed to bend larger bars. Radius bending of round rods ⅝-in. in diameter and smaller can be performed on the spiral bending attachment.

Although the spiral bending mechanism was supplied as an attachment on this machine, it ordinarily is preferable to employ a separate unit, costing little more than the attachment, for spiral bending, as the latter arrangement permits simultaneous operation of both machines and avoids tying up the larger unit for the bending of small rods. Adjustability of the spiral bending attachment, as well as of separate spiral bending machines, is practically unlimited, as the radius of the bends can be varied from 4 in. to infinity. Two horizontal power-driven rolls of the spiral bending attachment feed the rod between two vertical idler rolls mounted on an adjustable vertical plate. Setting of the idler rolls is readily varied by raising or lowering the plate with a lever handle, as illustrated by a photograph. A spring pawl fitting into cut teeth in the curved edge of the plate locks the adjustment in position for bending rods to desired radius.

Horizontal power rolls of the spiral bending attachment are driven through two vertical shafts. One of these shafts is mounted at its lower end in a double-row, self-aligning, heavy-duty ball bearing. This shaft can be adjusted quickly to accommodate rods of ¼- to ⅝-in. size between the rolls.

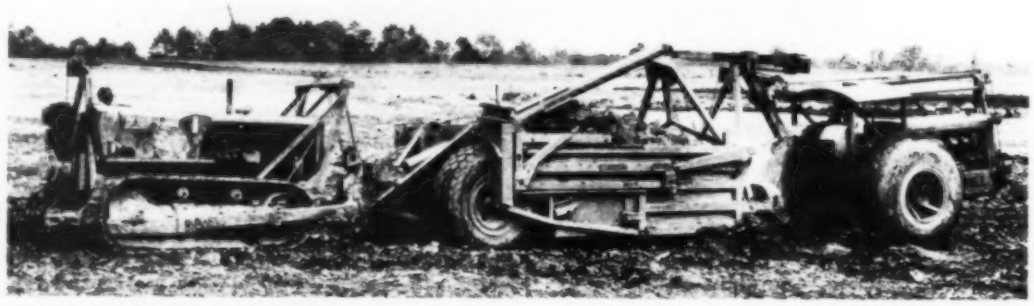


SPIRAL BENDING ATTACHMENT fitted with adjustable idler rolls on movable vertical plate turns continuous spirals to any radius from 4 in. to infinity at high speed. Below machine are one spiral and several 1¼-in. rods bent to arcs of short radius.

★ ★ ★

Fast Scraper Hauling

WITH TWO-WHEEL TRACTORS



DESIGNED FOR PUSHER LOADING by powerful tractor brought up against bumper at rear end of scraper, digging-hauling units also make use of puller tractor in difficult loading conditions.

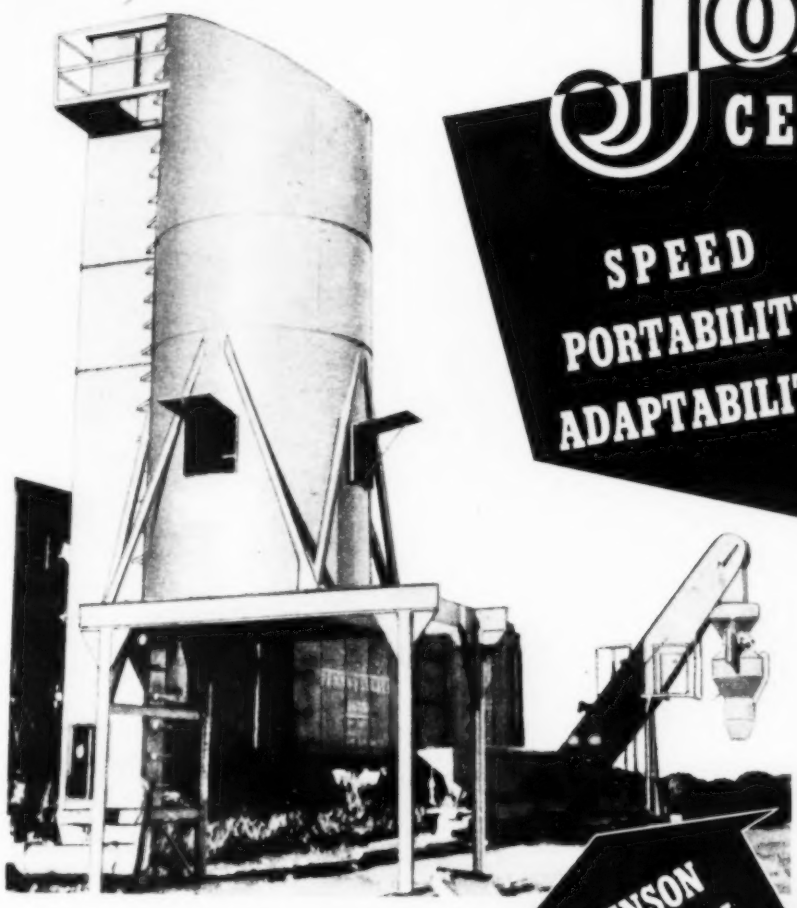
FOR FAST TRAVEL on long hauls, Sammons-Robertson-Wiltsee & Daniel, contractors, Huntington, W. Va., operated four Tournapull two-wheel pneumatic-tired tractors with top-speed ratings of 21 m.p.h. to draw huge wheeled carrier scrapers with heaped-load capacities of 30 cu.yd. on Pinopolis da mand power-house excavation of the Santee-Cooper project at Moncks

(Continued on page 74)

JOHNSON CEMENT PLANTS

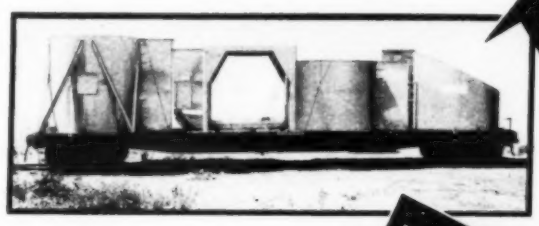
SPEED
PORTABILITY
ADAPTABILITY

NOW! MORE IMPORTANT THAN EVER BEFORE—time and labor saving features, fast efficient operation, and adaptability to any construction need or situation must be present in all construction equipment.



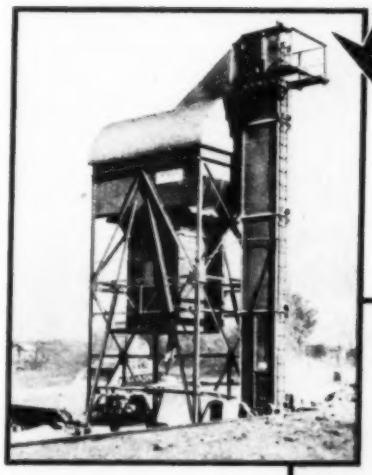
- ★ Only two men needed on Johnson cement plants—with hopper-bottom car or bulk truck cement delivery.
- ★ 120 batches or 200 barrels of cement can be batched per hour through any Johnson Cement Plant with manual control.
- ★ Bulk trucks, truck mixers, or both can be charged through Johnson Cement Plants.
- ★ Johnson Cement Plants are adaptable for box car, hopper bottom car or bulk truck cement delivery.
- ★ All Johnson Cement Plants are quickly and easily convertible from batching plants to transfer plants or vice versa. Transfer plants have 250 barrel per hour capacity.
- ★ Johnson Cement Plants are really portable—Elevating Charger, Dutchmill and Portable Section Cement Bins can be completely erected or dismantled by three men in two hours' time.
- ★ Elevating Charger is economical with bag cement—elimination of split sacking and much labor, plus faster batching time for both batch trucks or truck mixers are possible.

JOHNSON DUTCHMILL

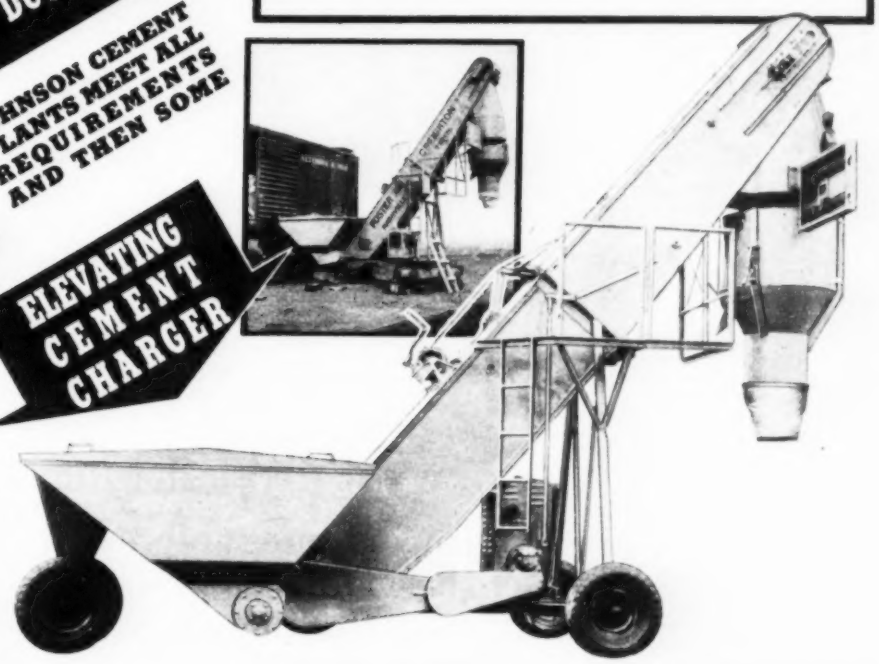


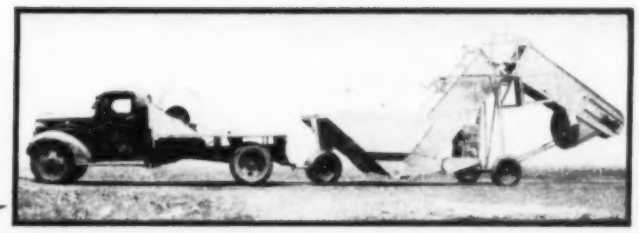
JOHNSON CEMENT PLANTS MEET ALL REQUIREMENTS AND THEN SOME

PORTABLE SECTION BINS AND CEMENT SILOS



ELEVATING CEMENT CHARGER



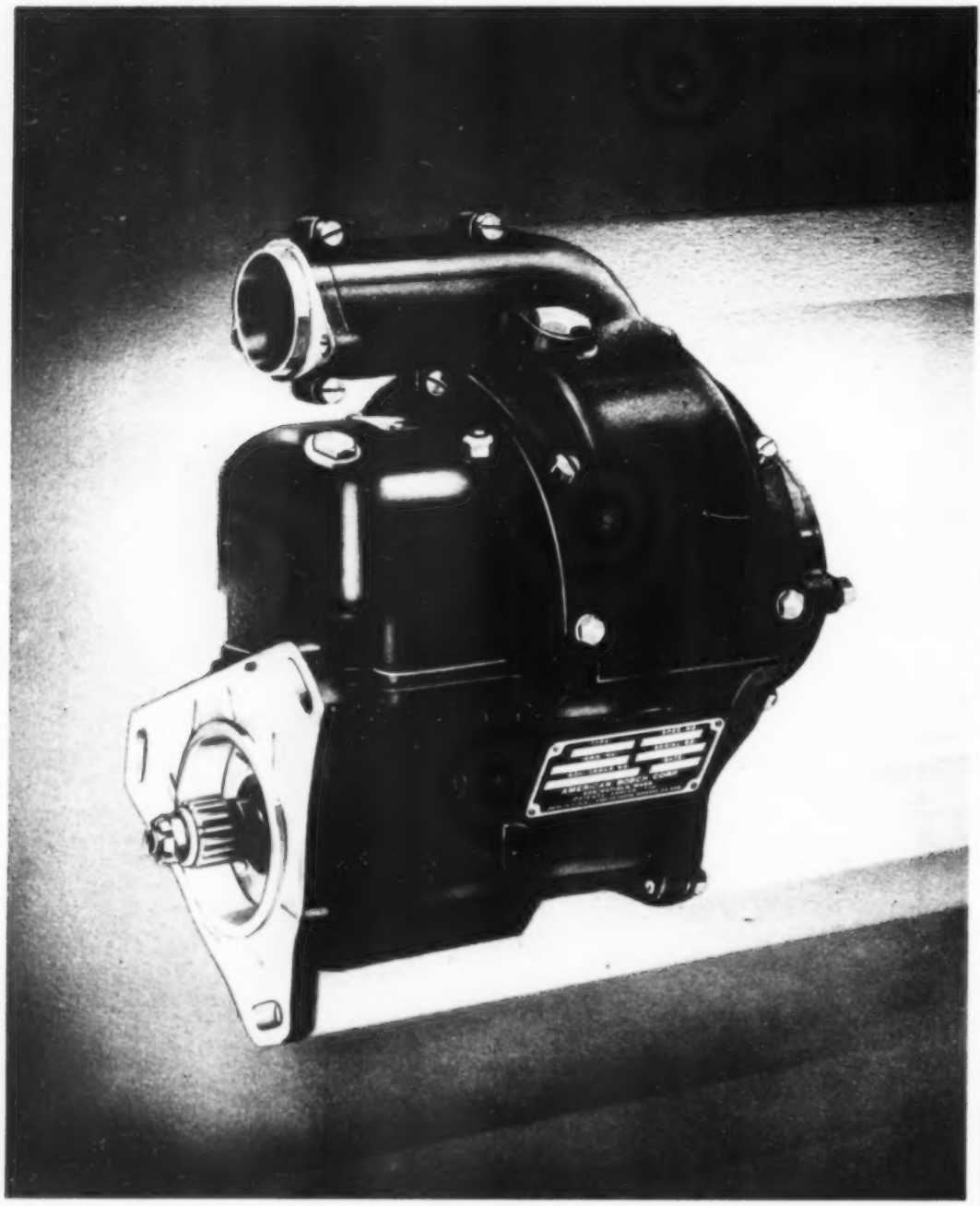


JOHNSON CEMENT PLANTS ARE AVAILABLE WITH CEMENT STORAGE CAPACITY FROM 25 TO 7000 BARRELS.

★
FOR FURTHER INFORMATION WRITE THE

CHAMPAIGN ★ C.S. JOHNSON CO. ★ ILLINOIS

SKY HIGH



FOR engines requiring magneto ignition, American Bosch has always been the hallmark of quality. The war in the air gives fresh significance to this reputation, for today American Bosch Aviation Magnetos are standard on some of America's mightiest warplanes.

AMERICAN BOSCH CORPORATION, Springfield, Mass., and Providence, R. I.
Branches: New York · Cleveland · Detroit · Chicago · San Francisco
(Also makers of American Bosch Coils, Generators, Windshield Wipers and Diesel Injection Equipment)

AMERICAN BOSCH MAGNETO

(Continued from page 72)

Corner, S. C., for the South Carolina Public Service Authority. The Tournapull tractors were equipped with Caterpillar 160-hp. diesel engines and were mounted on tires 80 in. in diameter by 24 in. broad.

BIG TIRES and powerful diesel engine enable two-wheel tractors to pull pneumatic-tired carrier scrapers of 30-yd. heaped-load capacity at travel speeds ranging up to 21 m.p.h.

In sandy soil, causing loading difficulty, two Caterpillar 97-hp. low-gear diesel tractors assisted scrapers by pushing at rear and pulling in front while each unit picked up its load. The contractors credited the tractor-scraper units with 20-yd. payloads.

A study of the operating cycles of the four units on the job yielded the following data:

	No. 1	*No. 2*	*No. 3*	*No. 4*
Average one-way haul, ft.	5800	5800	5800	5800
Average cycle time, min.	14.3	15.5	14.8	16.7
Trips per 50-min. hour	3.50	3.22	3.38	3.00
Pay yards per trip	20	20	20	20
Pay yards per 50-min. hour	70.0	64.4	67.6	60.0

Average pay yards per 50-min. hour	65.5
Average loading time	1.05 min.
Average loading distance	102 ft.
Average spreading time in 4th gear	0.3 min.
Average spreading distance " "	150 ft.

★ ★ ★

Oil Pipe Line

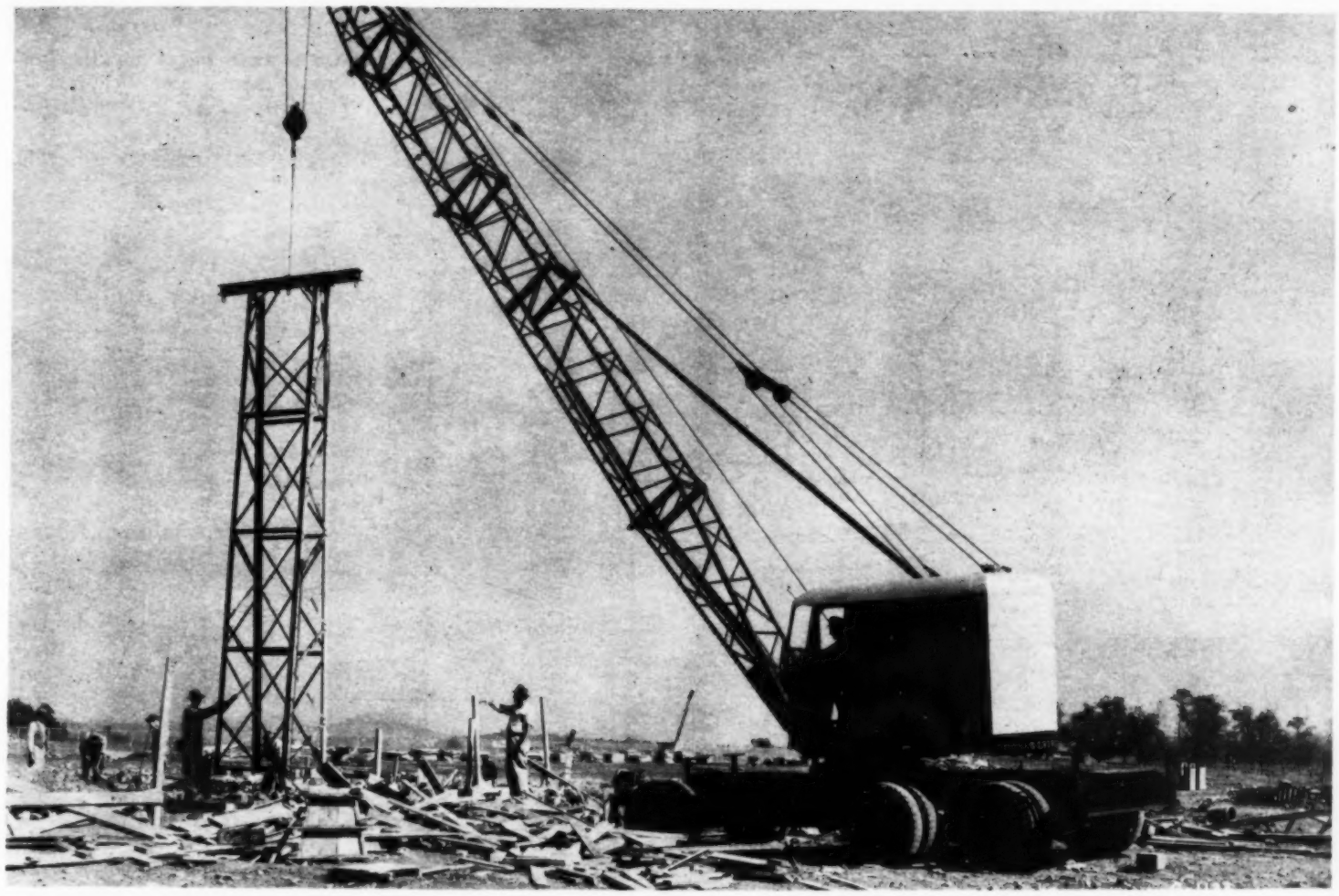
Built Through 65 Miles of Difficult Terrain

(Continued from page 63)

level at a location near West Boylston.

Three rivers are crossed by the pipe line: the Assonet, with a width of 613 ft. and a maximum depth of 21 ft. at the crossing; the Taunton, which is 194 ft. wide and 10 ft. deep at the crossing site, and the Charles, which was crossed at a location where it is 118 ft. wide and is relatively shallow. The crossing of the first two rivers involved the use of dredges. A pending channel deepening of the Taunton River made it necessary to bury the pipe line from 8 to 10 ft. below the existing river bed. Extra heavy river pipe was used in all cases and be-

(Continued on page 76)



GENERAL

SUPERCRANES are selling faster than we can build them. Still, now is a good time to find out how you can save with a SUPERCRANE.

GENERAL SUPERCRANE!

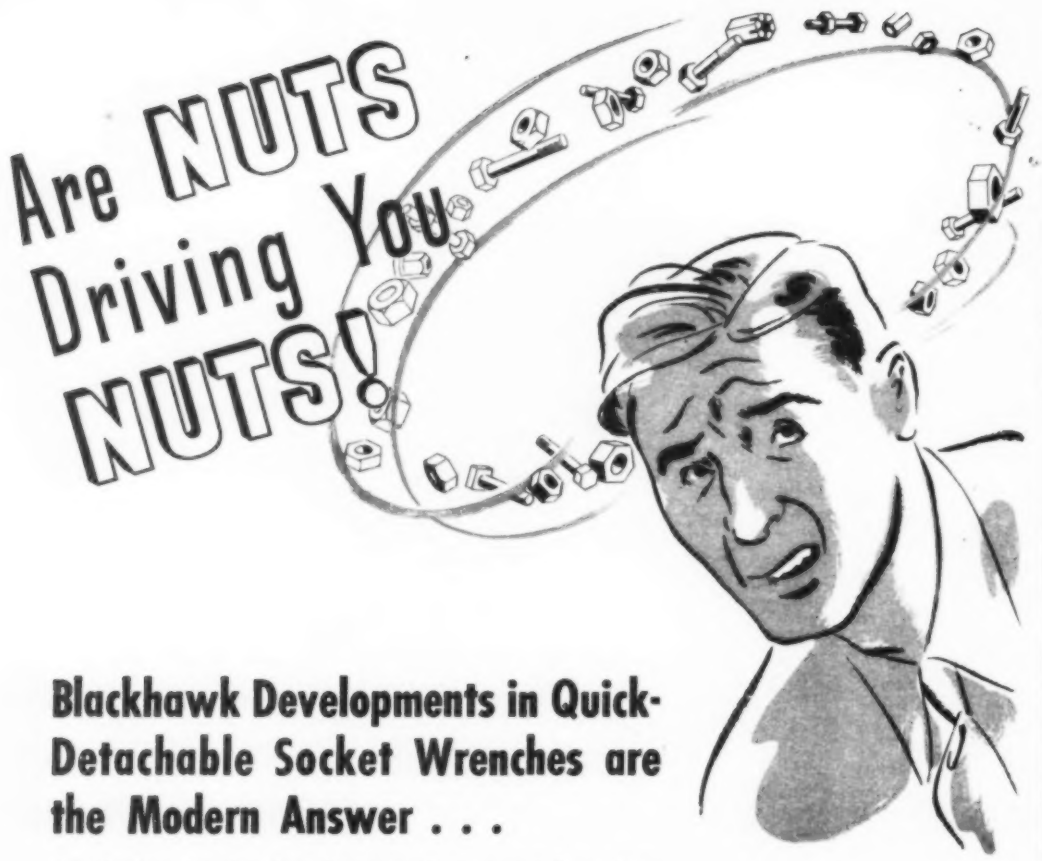
Why Super? Because it is better!—Because it requires but one operator, and has but one engine—yet is mounted on rubber tires, steers hydraulically, moves without tracks or overhead connections—goes most anywhere. The SUPERCRANE will handle more material faster, easier, and for less cost. Available as Crane, Clamshell, Dragline and Pile Driver.

GENERAL GIVES YOU MORE!

The OSGOOD COMPANY
Sizes: ½ to 2½ Cu. Yd.
Diesel - Oil - Gas - Electric
Associated with
The GENERAL EXCAVATOR CO.

The HERCULES COMPANY
HERCULES *IRONEROLLERS*
6 to 12 Tons
Diesel or Gasoline
Associated with
The GENERAL EXCAVATOR CO.

GENERAL
Sizes:
⅜-½-⅝-¾ Cu. Yd.
Diesel—Gas—Electric
SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted
THE GENERAL EXCAVATOR COMPANY, Marion, Ohio



Blackhawk Developments in Quick-Detachable Socket Wrenches are the Modern Answer . . .

A whale of a lot has happened to wrenches since open-ends and monkey wrenches handled most nut problems. The wrenches of the hour are Blackhawk quick-detachable SOCKET WRENCHES—they're setting new standards in speed, safety and efficiency in aviation, industrial and construction work today because they are expressly engineered to handle the most complicated assembly, service, and maintenance jobs.

Here's How You Can Speed Up Production!

Don't let your men pick up any old wrench for the job! Make up a combination of selected Blackhawk sockets, attachments, and handles that give them *just the right* leverage and clearance. (You can build over 23,000 combinations from one 50-piece set of Blackhawk Socket Wrenches.) Today, a Blackhawk socket with a 3/4" opening has a wall thickness of only .0615" — *an example of why Blackhawk sockets are preferred over big-jawed adjustable and open-ends.* Above all, don't waste time making special wrenches, when a combination of standard Blackhawk wrenches does the same work. Find out about "Lock-On" and other exclusive features. If your nuts and bolt-heads use wrench openings from 3/16" to 3½", call your Blackhawk Industrial Supply Distributor — or write us — for your copy of the informative "Handy Guide".

A Product of

BLACKHAWK MFG. CO.

Department W2342 MILWAUKEE, WIS.

(Continued from page 74)

cause of the salt water the pipe was coated with pipe enamel and wrapped with asphalt-impregnated felt for additional protection.

Except at the river crossings, the laying of the pipe in the trench was done with the aid of crawler tractors equipped with side booms. All joints in the line were arc-welded by crews of the C. N. Flagg Co., of Meriden, Conn. The laying of this pipe line through a built-up section of Massachusetts involved crossing more than one hundred highways, passage under railroad rights-of-way, through towns and back yards of dwellings.

For the Shell Oil Co. construction of the 65-mi. pipe line was directed by S. S. Smith, manager of the company's pipe line department.

★ ★ ★

Concrete Pipe Line Distributes Water Under High Pressure

(Continued from page 66)

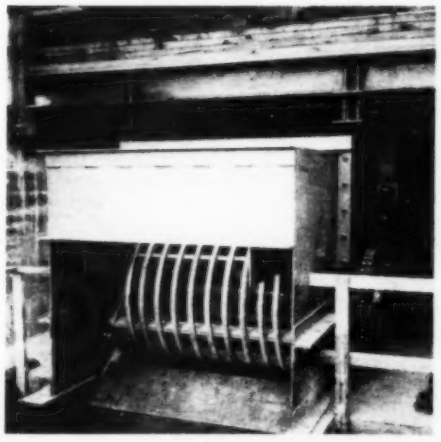
ment. Excavation was done with a ladder-type trenching machine and pipe sections were lowered to place by a Lorain 40 truck-mounted crane. Backfilling followed the installation of the pipe very closely, so that a minimum of trench was left open from day to day. Mortaring and pointing up of the joints also was kept up close to the pipe-laying operations and final cleanup followed as rapidly as possible during the progress of the work.

Similar Installation

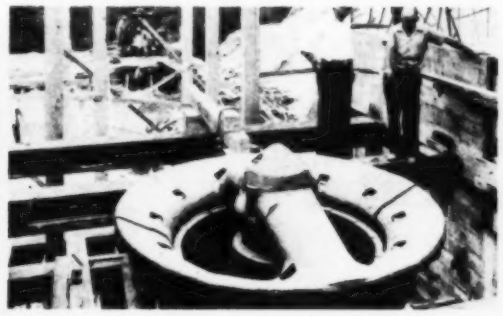
Another similar pipe-line installation, the Upas St. connection, was made in the fall of 1941. This installation consisted of 4,000 ft. of 36-in. diameter reinforced concrete cylinder pipe with rubber gasket joints to work under a maximum operating pressure of 100 lb. per sq. in. This short line also crossed a main intersection, University Ave., which carried street car and automobile traffic. The crossing was made by jacking a reinforced concrete pipe casing underneath the width of the highway and then pushing the 36-in. concrete pressure pipe through this casing. The space between the casing and pressure pipe was filled with cement grout.

Plans and specifications on both of these installations were prepared by the Water Department of the City of San Diego, under the supervision of Fred D. Pyle, hydraulic engineer, and his assistant, Paul Bierman. All of the pipe was manufactured by the American Concrete & Steel Pipe Co. at its main plant in South Gate, Calif., and transported to the job and installed by the same company. C. M. Meade was in general charge of field work, with Clyde Grant as assistant.

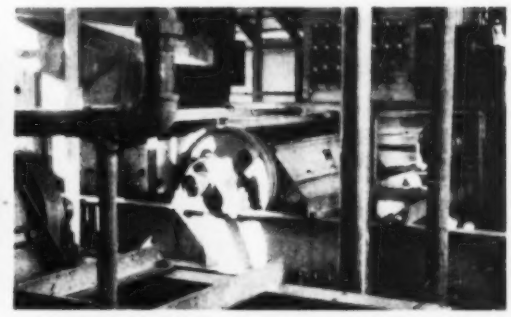
WATER FOR NEW YORK CITY



View of one of plant's two 36" x 6' Telsmith Reciprocating Plate Feeders, and No. 540 Telsmith Rotary Grizzly.



Plus 4" gravel goes to a No. 16-B Telsmith Gyratory Primary Crusher. Minus 4" gravel and sand is by-passed



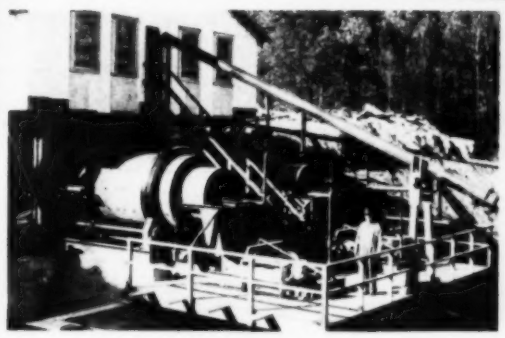
One 5'x12' Double Deck and two 5'x12' Telsmith Triple Deck Pulsators act as scalping, preliminary sizing and sand separating screens.

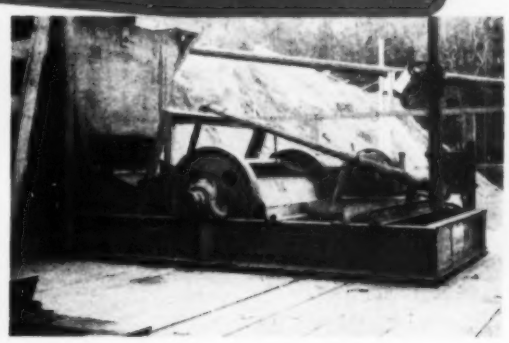
One of the two No. 36 Telsmith Gyrasphere Crushers producing minus 1½" or minus ¾" product as required.

800,000 yds. of aggregate for Delaware Aqueduct

SUPPLIED BY THIS

TELSMITH PLANT





Processing 800,000 cu. yds. of concrete aggregates for the big Delaware Aqueduct. And meeting the tough specifications of the New York City Board of Water Supply—1½" and ¾" gravel, and minus ¼" sand with no crusher grits. A big job! And it takes a big tonnage plant! The Rossoff Sand & Gravel Corp. has just such a plant near Kerhonkson, N. Y.

In co-operation with Mr. Samuel R. Rossoff and his engineers, this new and completely modern plant was designed by Telsmith. Telsmith built the machinery . . . supervised its installation . . . co-ordinating and balancing every unit. And the plant is turning out its required tonnage every hour. Telsmith sound engineering experience, Telsmith high grade equipment, and Telsmith centralized responsibility, here as in so many other plants, delivered all-around satisfactory results.

Are you about to build a new gravel pit, or quarry plant? Or planning to expand your present plant? Then it most certainly will pay you to find out about Telsmith complete plant service and equipment.

***Get Bulletin G-10.* Sent free, on request.** G-8

SMITH ENGINEERING WORKS, 510 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

Room 1604—50 East 42nd St. New York City | **211 W. Wacker Drive Chicago, Ill.** | **713 Commercial Trust Bldg. Philadelphia, Pa.** | **19-21 Charles St. Cambridge, Mass.** | **Borchert-Ingersoll, Inc. St. Paul, Minnesota** | **Brandeis M. & S. Co. Louisville, Ky.**

Charleston Tractor & Eqpt. Corp. Charleston, W. Va. | **Roanoke Trac. & Eqpt. Co. Roanoke, Va.** | **North Carolina Eqpt. Co. Raleigh and Stateville, N. C.** | **Wilson-Weesner-Wilkinson Co. Knoxville and Nashville, Tenn.** | **G. F. Seeley & Co. Toronto, Ont.**

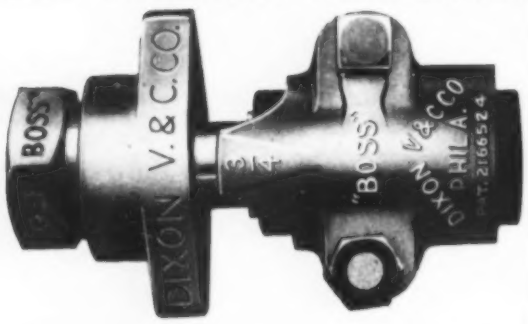
No Bottleneck Here!

There's no excuse for slowdowns in air equipment operation due to faulty connections, when you can still get

"GJ-BOSS"

GROUND JOINT

AIR HAMMER COUPLINGS



Compact Type, Style XLB-61, ½" and ¾"
Heavy Type, Style XHB-72, ¾" and 1"

These washerless, *leakproof* couplings have a long-standing reputation for all-out dependability on rock drills, paving breakers and other pneumatic tools. Exceptionally "easy" on the hose. Ground joint construction provides perfect soft-to-hard metal seal and avoids loss of time for washer replacements. Powerful grip of "BOSS" Interlocking Clamp eliminates danger of blowoffs. Furnished with either male or female spud.

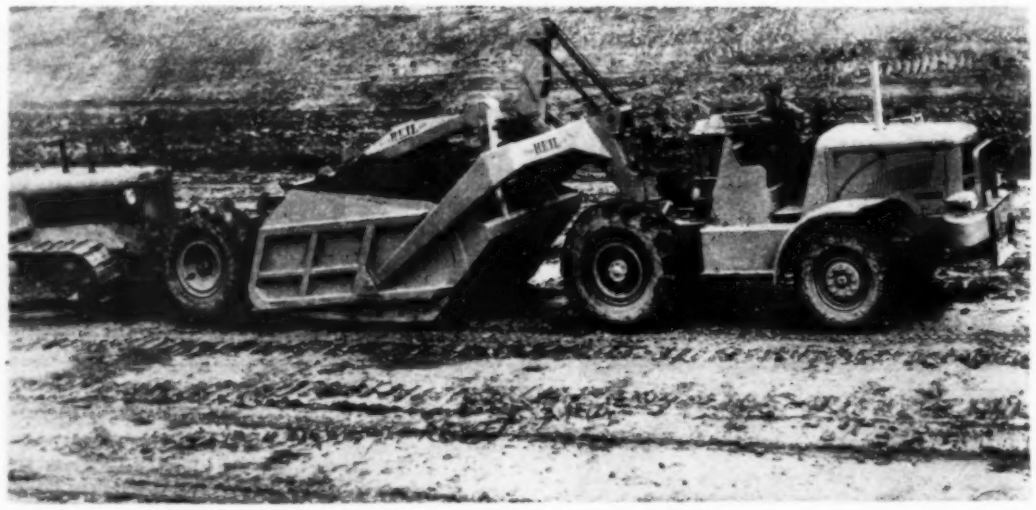
For *washer* type couplings of same style, specify "BOSS" Air Hammer Couplings. For couplings of same constructions but with mall. iron band type clamps, specify "G J — DIXON" (Ground Joint) or "DIXON" (Washer Type) Air Hammer Couplings.

Stocked by Leading Rubber Manufacturers and Jobbers

DIXON
VALVE & COUPLING CO.
MAIN OFFICE AND FACTORY: PHILADELPHIA
BRANCHES: CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON

CONSTRUCTION EQUIPMENT NEWS

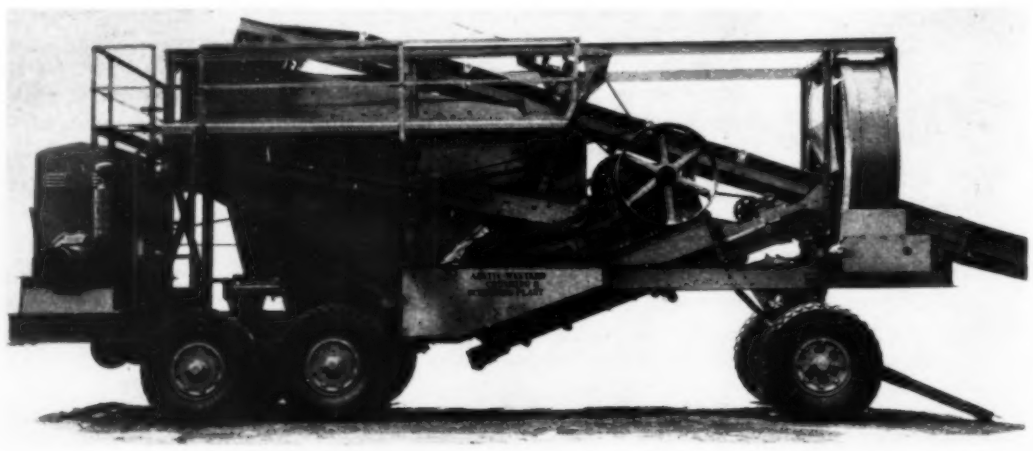
Review of Construction Machinery and Materials for APRIL, 1942



CABLE SCOOP, powered by diesel-powered tractor and push-loaded with crawler tractor, is said to dig heaped 15-yd. load in 40 to 50 sec. and to travel to fill at speeds of 6 to 20 mph., depending on road and grade conditions. Faster operation and greater efficiency of this combination claimed to enable contractor to show faster running time on hauls where slower crawler-scraper operations would not be practical. Tractor unit which provides power for scoop is 4-wheel unit equipped with 150-hp. Cummins diesel engine, with gasoline or other make diesel engines available. Unit has hydraulic power steer and oversize brakes on tractor-drive wheel and also on scoop trailer wheels operated by foot pedal. Individual hand control brakes on tractor drive wheels give short turning radius said to assist in easy operation. American blower fluid coupling drive claimed to reduce gear shifting to minimum. Heavy-duty rear axle provided to withstand shock and strain of operating on rough, bumpy terrain. Dimensions of tractor: wheelbase, 108 in.; rear axle, 19 in.; ground clearance, 17 in.; overall length, 203 in.; weight with power control unit attached, 17,450 lb.—**The Heil Co., Milwaukee, Wis.**

★ ★ ★

PORTABLE TWIN UNIT CRUSHING PLANT, said to be capable of delivering exceptionally large outputs of crushed gravel or stone, has reduction unit claimed to be suited equally well for gravel or for quarry service. Consists of all roller bearing roll crusher, 4x12-ft. triple-deck gyrating screen and rotary return elevator mounted on six-wheel, pneumatic-tired truck equipped with 30-in. feed and delivery conveyors. Primary unit which is used ahead of secondary unit for gravel service normally consists of jaw crusher with scalping screen mounted on truck with feed conveyor. For quarry service, large opening jaw crusher with apron-type feeder is used. Moving weight of secondary plant, 39,000 lb.; overall width, 8 ft.; overall height, when operating, 13 ft. Weight of primary unit for gravel service, 23,000 lb. with overall width of 8 ft. and height of 11 ft. Use of two units permits flexibility of operation and also accessibility of parts.—**Austin-Western Road Machinery Co., Aurora, Ill.**



PRECISION CONTROL

3/8 TO 3 YARD CAPACITY

LINK-BELT SPEEDER

SHOVELS–DRAGLINES
CRANES

● "Give me the steel and I'll put one of these things together in 12 days." That's what the erection crew foreman said about constructing 270 x 340 feet hangars at Westover Air Base, Mass.

This statement is based on performance records of Link-Belt Speeder cranes handling the 20 ton pre-fabricated steel sections. Equipped with Speed-o-Matic Control these machines do the job faster and more efficiently.

Where girders have to be carefully handled, raised or lowered accurately, Link-Belt Speeder's engineering and operating advantages make any job simpler and easier. Extra large, smooth-working clutches assure precision control for greatest safety and accuracy. Added weight for stability and reserve power for extra heavy-duty work are inherent qualities of every Link-Belt Speeder machine.

Speed and dependability are now more important than ever before — Link-Belt Speeder cranes give you both.

Ratings range from 3 to 45 ton capacity. 8806

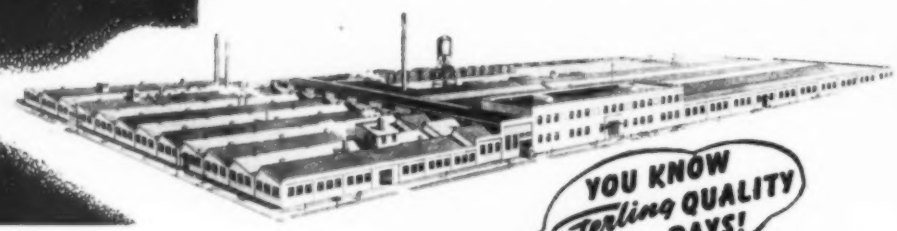
LINK-BELT SPEEDER CORPORATION

Builders of the Most Complete Line of Shovels and Cranes

301 WEST PERSHING ROAD • CHICAGO, ILLINOIS

BALANCED WHEELBARROWS...
EASY-WHEELING *and* TOP QUALITY
...for over 38 YEARS!

● When STERLING started in 1904, contractors and engineers were assured, for the first time, of standards of QUALITY equal to the toughest demands of the construction industry. TODAY, with over 38 years' experience and improvements in design, materials and construction, STERLING QUALITY STANDARDS have advanced to meet the strenuous war time demands of the construction industry.



YOU KNOW Sterling QUALITY PAYS!

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Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

IN NAVY ACTIVITIES TOO ...

...ROGERS HEAVY DUTY TRAILERS ARE PARTICIPATING HELPFULLY

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220 ORCHARD ST.

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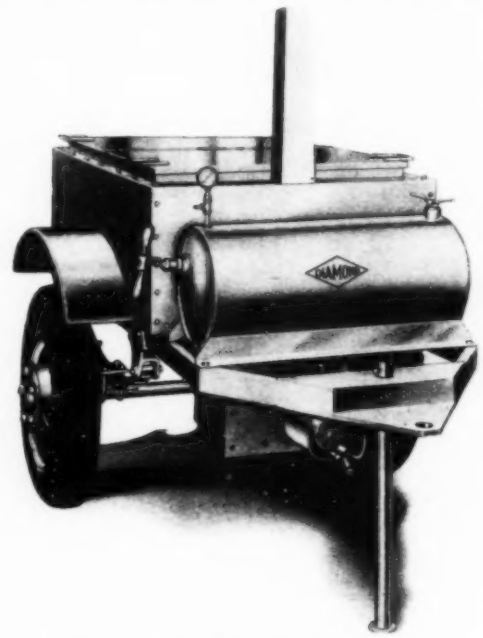
ALBION, PENNA.

EXPERIENCE *builds 'em*

PERFORMANCE *sells 'em*

PORTABLE TAR AND ASPHALT MELTING KETTLE has frame of 3-in. channel steel with electric welded body of 12-gage steel covering melting tank of 10-gage steel. Frame and body are mounted on 2-in. standard axle, two pneumatic-tired wheels and semi-elliptical springs. Mahr burner said to give



quick intense heat which envelopes entire kettle and results in fast melting and fuel economy. Heavy steel screen separates unmelted material from hot material enabling latter to flow freely to spigot. Steel hitch on front of channel frame makes hauling easy. Fuel tank has self-locking hand pump, safety valve, pressure gage and valve nipple for pumping tank from pressure hose. Tank capacity, 165 gal. Height, 52 in.; length overall, 9 ft. 3 in.; width, 64 in.—**Diamond Iron Works, Inc., Minneapolis, Minn.**

★ ★ ★

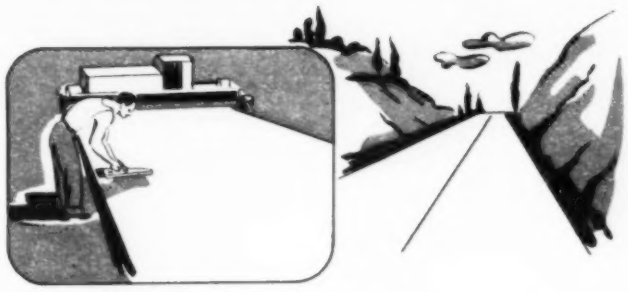
DOUBLE-ANGLE MOIL POINT, with hexagon shank, square taper and round cutting point, is said to have exceptional cutting speed and resistance to wear. Heat-treated by process especially developed to bring out fine qualities of steel and to give point long resistance to wear. Furnished in 14- to 30-in. lengths and with shanks 1⅛ in. and 1¼x6 in.—**Iron City Spring Co., 2913 Smallman St., Pittsburgh, Pa.**

★ ★ ★

PROTECTIVE COATING FOR STEEL, wood or concrete, known as Carbozite and obtainable because it consists of non-essential material, is manufactured from pyrobitumen ore. May be either sprayed or brushed on or dipped (in case of product finishing) and dries naturally in from 6 to 8 hr. May be baked dry to glass-like, enamel-type finish in short time. Carbozite coating said to form uniform, self-leveling film which will bond securely to any clean material and provide complete protection from acid or alkalai fumes, sulphur or salt air or water, smoke or soot and to be totally unaffected by moisture, sunlight or any corrosive or carbonizing agent. Claimed to retain ductile, flexible nature at all temperatures ranging from 40 to 450 deg. F. and consequently not to crack, peel, chip or sag. Manufactured in black and red oxide, with special coating in light or dark gray also available.—**Carbozite Corporation, 903 First National Bank Bldg., Pittsburgh, Pa.**

FOR MODERN, SCALE-RESISTANT HIGHWAYS

These New Vinsol-Treated Cements Give You Truly Scale-Resistant Concrete That's Easier to Place and Finish

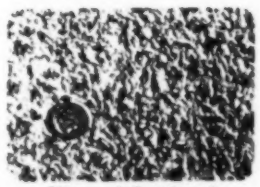


Pavement scaling has been successfully checked. Years of testing in more than a dozen northern states demonstrate that an answer has been found to this problem which now vexes all concerned with the design and construction of concrete highways.

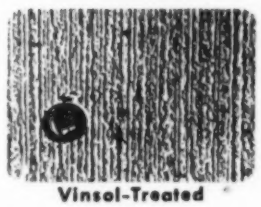
VINSOL-TREATED CEMENT THE ANSWER

A new kind of cement—conditioned during manufacture with minute amounts of Hercules' Vinsol* Resin—is the answer. All tests to date show that concretes made from these conditioned cements are definitely more resistant to surface-scaling and the disintegration which so frequently results. In one typical test series, concrete pavement (*upper*) made with normal portland cement and subjected to accelerated ice-removal action, scaled over from 65 to 85% of the total slab area. Adjacent sections, made with Vinsol-treated cement, (*lower*) scaled over only 0 to 5% of the slab areas . . . in the same time and under the same rigorous conditions.

Scaling of Typical Concretes



Normal Portland



Vinsol-Treated

*Reg. U.S. Pat. Off.

EASIER WORKING, TOO

All types of frost scaling are apparently equally reduced. And, in addition, concretes made with these new cements show increased ease of placeability . . . are more workable . . . and segregation, bleeding, and the formation of pockets of mortar or aggregate are less apt to occur. These qualities permit the finishing crews to work closer to the mixer, completing the job faster.

GET THE FACTS TODAY

The facts on these Vinsol-treated cements have been proved by hundreds of tests. Cement companies, highway departments, contractors, all have verified the remarkable results these conditioned cements make possible. Many cement companies now offer special Vinsol-treated cements for construction which will be exposed to freezing temperatures. Thus, your regular cement supplier can probably give you all the information you need. If not, write us for a complete bibliography of the work to date. Address Naval Stores Department, Hercules Powder Company, 966 Market Street, Wilmington, Delaware.

BETTER ROADS AHEAD is the title of a 15-minute, 16mm., sound-and-color motion picture which documents some of the work done with Vinsol-treated cements from 1938 through 1940. If your group would like to view this film, a showing can be arranged by letter to us.

Use "Vinsol-Treated" Cement FOR Reduced Surface Scaling

NAVAL STORES DEPARTMENT
HERCULES POWDER COMPANY INCORPORATED
974 MARKET ST., WILMINGTON, DEL.

Gentlemen:
Please send information on Vinsol-treated cements.

Name _____

Address _____

City _____ State _____ LL-66

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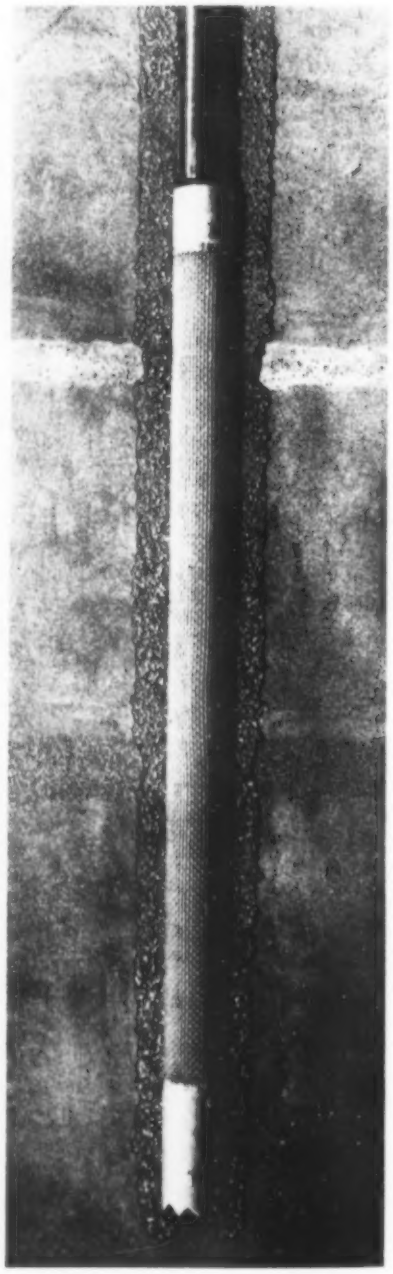
THE MORETRENCH CROWD!



Two-Valve Patented Construction Insures Large Jetted Hole During Installation, Permitting Sand Refill. Prevents Clogging During Operation. Good as a Graveled Well.

● In 1940 the Moretrench Wellpoint business equaled its best booom year record.

In 1941 that figure doubled itself largely because Government engineers and contractors began to get some first-hand evidence on the schedule-producing results and low dewatering costs that follow the use of the Moretrench Wellpoint System.

From experience private contractors have known for years that low bids on pumping equipment do not necessarily insure satisfaction. This fact has been emphasized on some of the Government work. For example, Camp Blanding saved a million by switching to Moretrench. The Willow Run Bomber Plant started with other equipment, but Moretrench is in practically exclusive use there now.

Many other Government projects are using Moretrench – counting on its time-proved advantages – reordering it again and again as facilities are expanded – depending on it to produce DRY RESULTS IN A HURRY!

Truck and carload shipments radiate from our Rockaway, N. J., Joliet, Ill., and New Orleans, La., distributing centers.

We rent or sell, in any quantity, or handle large dewatering operations on a lump sum or contract basis.

If you're looking for fast action on a wet job, follow the crowd to MORETRENCH!

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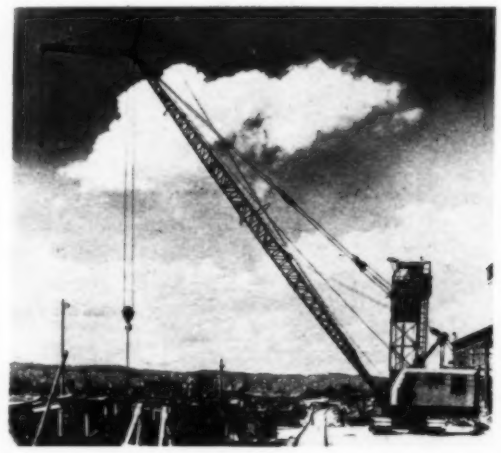
90 WEST STREET, NEW YORK

ROCKAWAY, NEW JERSEY JOLIET, ILLINOIS NEW ORLEANS, LOUISIANA

Cable Address: Wellpoints, New York

SHIPBUILDING CRANE shown in yard of Lake Superior Shipbuilding Co. of Superior, Wis., has 90-ft. boom with lifting capacity of 19,000 lb. at 55-ft. radius and 20-ft. jib with lifting capacity of 6,000 lb. at 75-ft. radius. Elevated 35 ft. above ground, operator's cab provides clear view of work. All controls



in cab. Especially suited to task of shipbuilding is planetary boom hoist feature of this crane said to permit delicate and precise handling of load and to be absolutely safe in operation. Powered by 176-hp. diesel engine which will operate on 3 to 3½ gal. of fuel oil per hour. For night work unit is equipped with floodlights which operate from lighting plant driven by independent gasoline engine. —**Harnischfeger Corp., Milwaukee, Wis.**

★ ★ ★

RECHARGEABLE FLASHLIGHT STORAGE BATTERY, wet-cell type, is now available for use instead of dry cell unit and is said to supply powerful always bright light, to burn continuously for hours, to save replacement expense and quickly to pay for itself. Other advantages claimed: precision-built rugged construction; weather-proof, spill-proof and moisture-proof; requires minimum of care; easily charged anywhere from electric outlet or automobile battery. Fits standard flashlight cases and takes place of two 1¼-in. size D dry cells. Liquid easily added by unscrewing filler cap and adding distilled water, as directed in instructions. Dimensions: 1¼-in. diameter, 4¾ in. high. Weight, approximately 7 oz.; transparent Lucite case; extra heavy plates; capacity 2 amp. hr.; 2.2 v. open circuit; discharge rate 450 mils.; 600 mils. maximum.—**Ideal Commutator Dresser Co., 1273 Park Ave., Sycamore, Ill.**

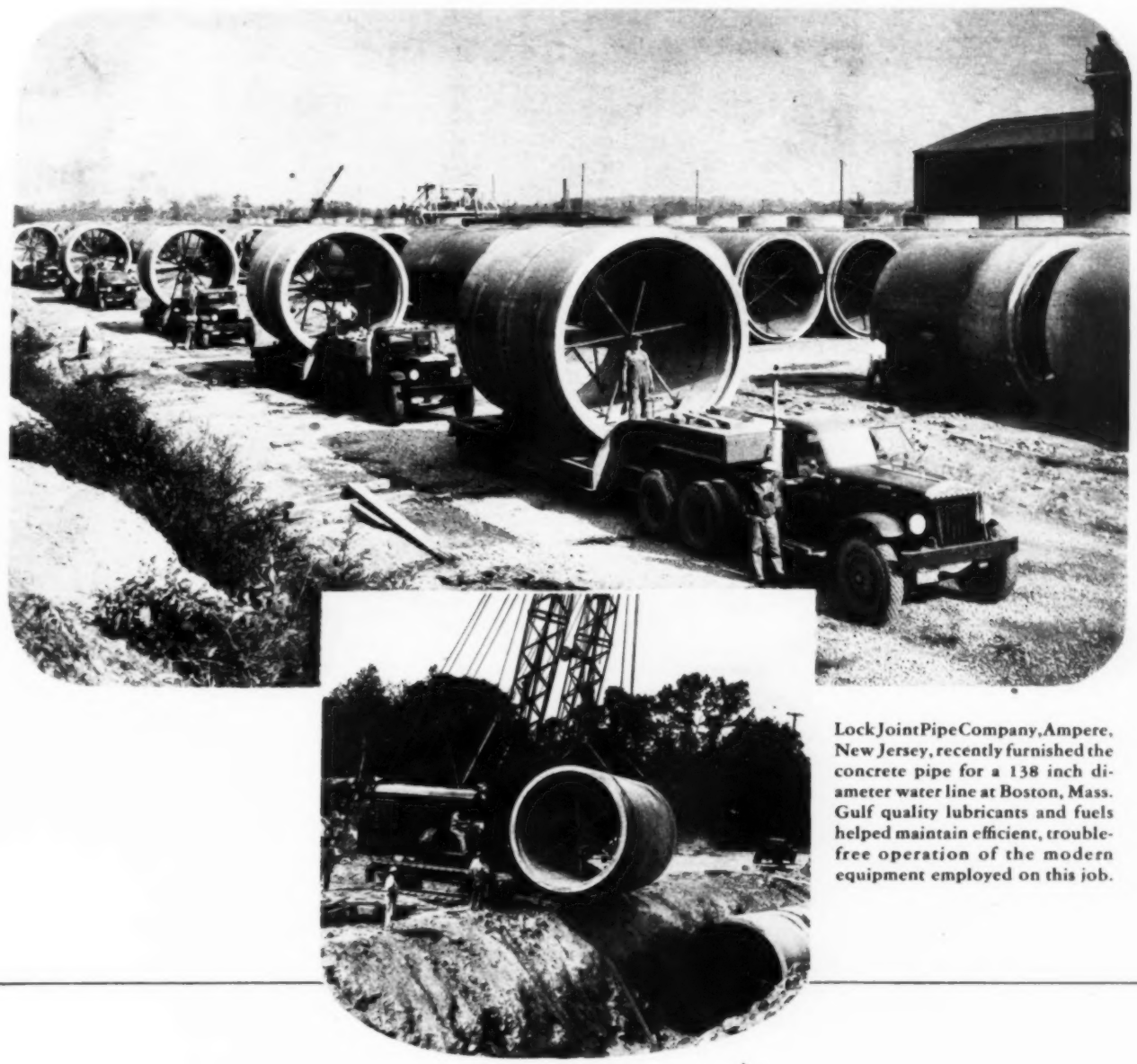
★ ★ ★

HEAVY- DUTY PORTABLE ELECTRIC DRILL is said to be extremely light in weight, to be powered for high speed drilling, to be able to stand up under heavy-duty operation and to be particularly adaptable for use in close quarters. Overall length, 8½ in.; overall height, 7½ in. Net weight, without cord,

4½ lb. No-load speed, 4,000 r.p.m. Removal of switch cover exposes switch which has all terminal screws on top for quick changing of motor and cord leads. Cord attachment also is exposed so that cord, if broken, may be pushed through strain reliever and re-attached. Removal of back cover exposes brushes and commutator for inspection or repairs. Another advantage is ease of operation with right or left hand.—**Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.**

"Good equipment plus GULF PRODUCTS equals better job performance"

. . . Says contractor on Boston water line project.



Lock Joint Pipe Company, Ampere, New Jersey, recently furnished the concrete pipe for a 138 inch diameter water line at Boston, Mass. Gulf quality lubricants and fuels helped maintain efficient, trouble-free operation of the modern equipment employed on this job.

"Gulf lubricants and fuels help us get efficient trouble-free service from every unit"

"WHEN we started this job, we put good equipment to work and standardized on Gulf lubricants and fuels", says water line project contractor. "And we secured the fine results we expected from this combination—no breakdowns, no mechanical troubles, and efficient, low cost operation — which add up to better progress on the job."

You, too will find it pays to use Gulf lubricants and fuels on your next contract. Always of the same uniform high quality, these Gulf products work as a team to keep equipment operating at maximum efficiency and at a minimum expense for maintenance and repairs. Call in a Gulf engineer today and ask him to recommend the proper types and grades exactly suited for your particular requirements.

No matter where your job is located, you are sure of quick delivery of Gulf quality products through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today. Gulf Oil Corporation—Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

GULF

You should carry one of these LUFKIN TAPE-RULES

If you ever acquire the habit of carrying a tape-rule, you'll wonder why you waited so long to get it. They're as handy as a watch to carry—and as useful, too. Your dealer will help you select the one best suited to your needs. May we send you a free copy of our new Catalog?

LUFKIN

SAGINAW, MICHIGAN · New York City

TAPES · RULES · PRECISION TOOLS

OPEN-END V-BELTING for installations which are inaccessible for application of endless V-belts has strength member consisting of multiple plies of heavy cross woven duck said to provide adequate anchorage for metal fasteners. Claimed to provide

V-belt efficiency and economy available for many drives where application of endless V-belts is not practical. Line shaft and similar drives may be belted in this manner. Most efficient at speeds below 3,000 fpm. Available in three standard sizes: B section — top width, 2 1/32 in.; angle, 40 deg.; thickness, 7/16 in.; C section — top width 7/8 in.; angle 40 deg.; thickness 5/8 in.; D section top width 1¼ in.; angle 40 deg., thickness, ¾ in. Minimum recommended pulley diameters for B, C and D sections, respectively, 5.4, 9 and 13 in. — **The B. F. Goodrich Co., Akron, Ohio.**

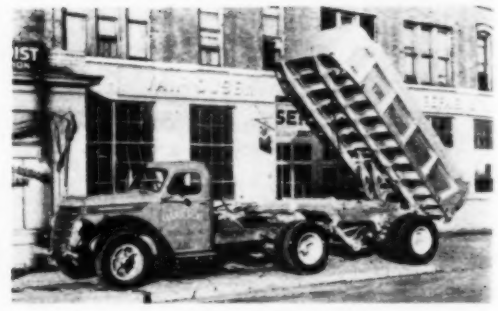
★ ★ ★

RUST PREVENTIVE, named "Aqua-Clear," is tasteless, harmless liquid claimed to prevent rust and to provide clear water from any metal tanks or pipes and from lead, brass or block, galvanized or cast-iron water systems. Also clears loose rust from old tanks and pipes. May be added in minute quantities to water manually or by a proportioning device, if desired. Amount required to prevent rust is 1 oz. to 100 gal. of water. Rust formation is prevented by deposit of thin, non-permanent film on metal surfaces said not to interfere with flow of water even in narrow pipes and not to build up to form scale. — **Sudbury Laboratory, South Sudbury, Mass.**

★ ★ ★

COMPLETE LINE OF TRUCK MIXERS, known as "Hi-Discharge" Moto-Mixers and Moto-Agitators are said to be of new design and to incorporate many revolutionary features, such as rear charging, an improved mixing principle, and high discharging point for greater spouting range. Rex mixing principle claimed to make drum self-cleaning while mixing, resulting in faster and better mix. Drum has

one opening for charging and discharging. Charging hopper serves as receiver for aggregates and as stationary throw-back blade while mixing and affords opportunity to sample batch. Claimed to be able to place concrete over 20- to 22-ft. areas on all types of jobs and to provide discharge height for pouring concrete directly into sidewalks and curbing from street. Feature of high discharge unit is Quint-spout which has five chuting lengths and zipper spout suspension. Other features: Inclosed anti-freeze water system; improved chain-belt drive and twin-clutch transmission; roomy inspection hatch with removable door.—**Chain Belt Co., Milwaukee, Wis.**



HEAVY DUTY HIGH TENSILE STEEL TRAILER BODY and cam-and-roller hydraulic hoist are features of this truck unit specially built to customer's requirements. — **Gar Wood Industries, Inc., Hoist & Body Division, Detroit, Mich.**

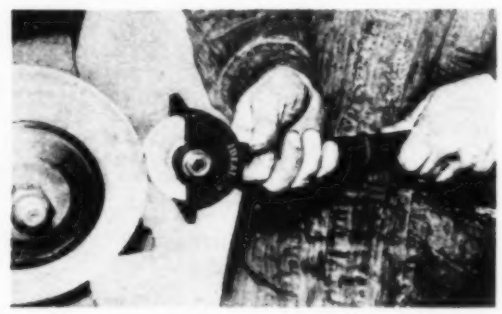
★ ★ ★

NEW TYPE OF HYDRATED FINISHING LIME to meet Federal specifications is said to shorten time required for new building, to simplify job repair and to eliminate necessity for soaking, material being dumped into water in mixing box, given 15 or 20 min. to absorb water and then mixed. No change in

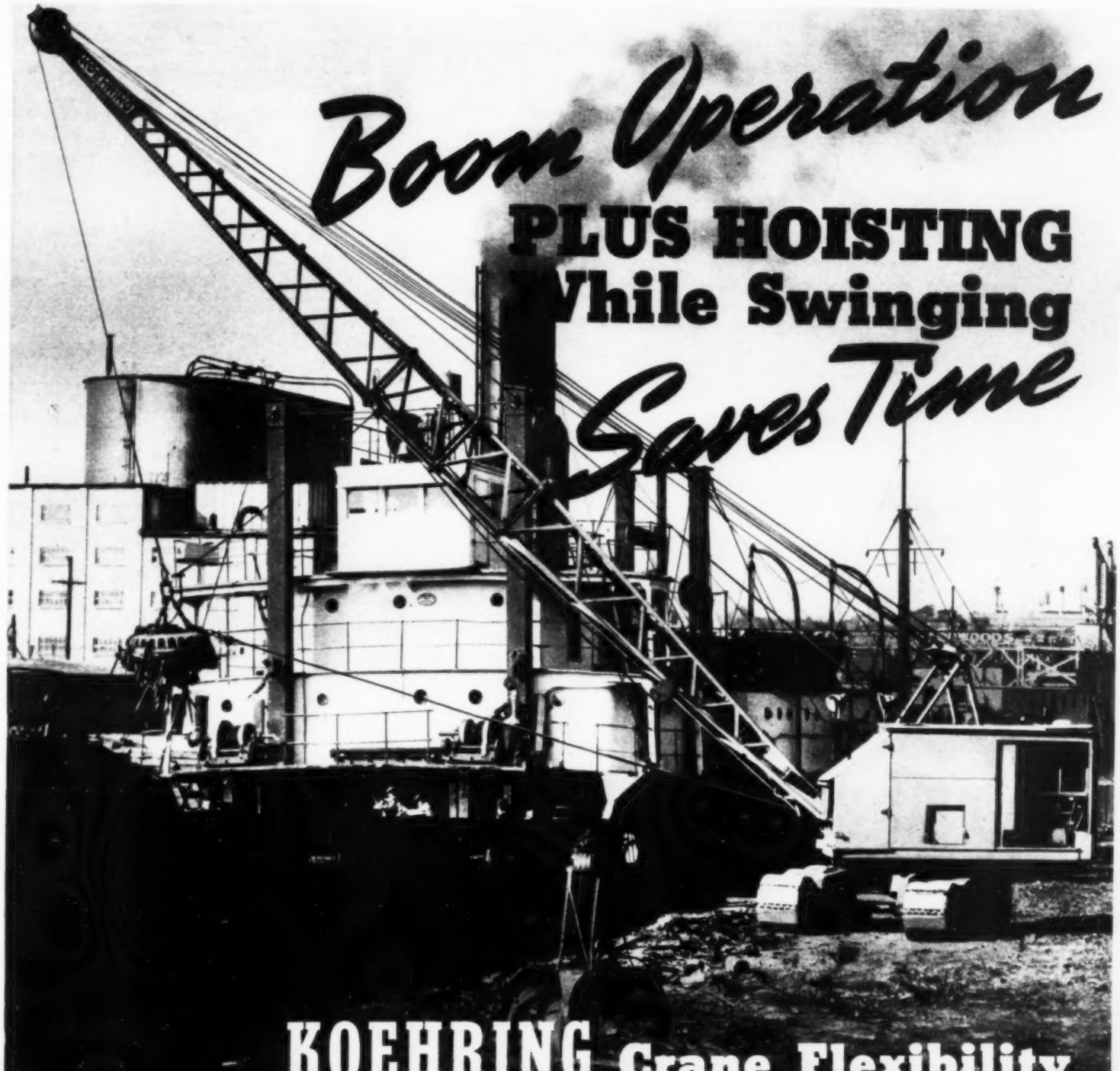
gaging procedure or quantities required with new lime. One part dry gaging plaster is added to 3 parts of hydrated finishing lime putty or, to each 12-qt. pail of putty 2 qt. of water are added taking up all water with gaging plaster. Blend gaging with putty to uniform, smooth mix and apply in customary way. Patch jobs can be handled without delay and with less muss than ordinarily results where putty must be mixed and let stand over night.— **The United States Gypsum Co., 300 West Adams St., Chicago, Ill.**

★ ★ ★

ABRASIVE WHEEL-TYPE GRINDING WHEEL DRESSER is said to give cutting and truing effect almost equal to that of diamond. Replaceable cutting wheel is held in protective metal housing which deflects grindings away from operator. Large handle makes tool convenient to hold or use. Besides



general cleaning and truing of grinding wheel, other uses include truing of cut-up and uneven sides, dressing out deep grooves and out-of-roundness, restoring out-of-balance wheels into true rotating ones. May also be used to shape wheels into different forms when form grinding is desired. Overall length, 13¾ in. Weight, 3⅛ lb.—**The Ideal Commutator Dresser Co., 1368 Park Ave., Sycamore, Ill.**



Boom Operation PLUS HOISTING While Swinging Saves Time

KOEHRING Crane Flexibility Is Important Time-Saver On This Job

Handling metal from stock pile to boat requires maneuverability. This, combined with the Koehring feature of raising or lowering the boom or hoisting while swinging or travelling, is reason why Koehring Cranes save time on this type of operation. Accurate magnet and grapple spotting and control is another important Koehring advantage. Steering in any direction in varying degrees of radii permits direct travel without "jockeying" around the yard. Time is an important factor in metal handling and Koehring Cranes are time-savers. Next time you need a crane talk to an owner or write us for complete information.

KOEHRING COMPANY · *MILWAUKEE, WISCONSIN*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

BATTLES ARE WON BY BUCKETS, TOO!

Behind every successful army in the field is alert, fully mobilized INDUSTRY at home.

We are proud that Page AUTOMATIC Dragline Buckets are IN ACTION throughout the home front. Glad to know that now—when speed is needed—Page Buckets are living up to their reputation for OUTDIGGING ALL OTHER BUCKETS of equal size and weight.

May we suggest that, on YOUR job . . . in team work with YOUR machine . . . a Page AUTOMATIC Bucket will INCREASE YOUR PRODUCTION with NO increase in operating cost.

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BOOST PRODUCTION ★ KEEP AMERICA STRONG

PAGE *Automatic* **DRAGLINE BUCKETS**

Address this Coupon to: Dept. D-6, Page Engineering Company, c/o Clearing Post Office, Chicago, Ill.
Without obligating me in any way, mail a copy of your new descriptive bulletin entitled "Your Dragline WILL Move Dirt Faster."

Name _____ *City* _____

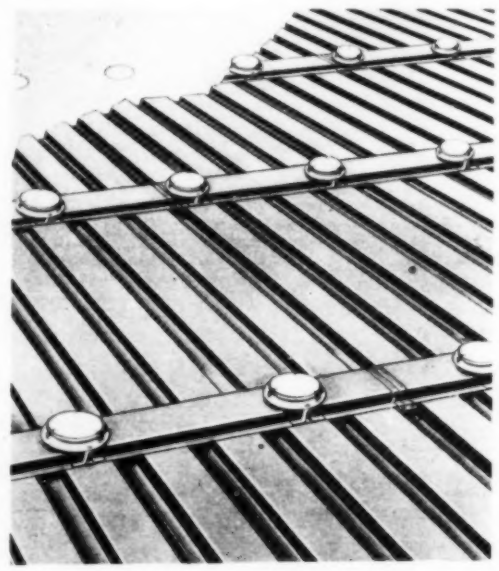
Street _____ *State* _____

FORM TIE called Flex-Ty, for warped, arc and chord, battered and multiple battered walls, is said to have flexibility of snake wire and yet to be strong enough to break ½-in.-diameter bolt and to have all conveniences of wire, band or plain rods. Made of cold drawn wires, one end having preformed helix (wire coil nut) welded to two strut wires. Lag screws (Tylags) are used in helix end

of tie and two wires on free end are engaged in Flex-Ty clamp, especially constructed with hardened wedge-shaped bolt, head of which rests against two wires when nut is drawn up tight. Guaranteed 5,000 lb. safe load per Ty. Ultimate strength claimed to be 8,000 lb. Light in weight, they are said to be easy to install and strip, to require no rod couplings, no rod pulling, nor any chipping back in concrete at exposed surface. Flex ties are made in even ½-ft. or 1-ft. lengths beginning at 3 ft. This first length Ty with 2x6-in. studs and walers, on edge, will fit wall thicknesses up to 19 in. Flex clamp requires at least 6 in. of tie wires and when drawn up tight will not slip or stretch, thus assuring correct wall sizes.—**Richmond Screw Anchor Co., Inc., 820-828 Liberty Ave., Brooklyn, N. Y.**

★ ★ ★

ELECTRICAL FITTINGS AND ACCESSORIES for underfloor distribution systems used with Robertson Q-floor are now available to users of this product. Cellular steel Q-floors, manufactured by H. H. Robertson Co., Pittsburgh, are available over entire area for electrical services of all types. Their hollow cells are on 6-in. centers and it is possible to install eight outlets in any 1-sq.ft. of floor area. Three



types of distribution fittings or header-ducts, are manufactured: (1) standard type, available in lengths up to 4 ft. 6 in., for installation on top of cells; (2) slot type, consisting of 6-in. connecting and junction units, for installation in slots in top section of cells; (3) ceiling type for installation on cells. Outlet fittings include two standard types—high tension and low tension and are installed directly on cells of Q-floor by fittings called "taps" which screw into upper portion of floor cells. Standard tap adjustable from 2½ to 3½ in. Internal diameter, 1¼ in. Accessories include: (1) for connecting panel to Q-floor; (2) for connecting conduit to Q-floor; (3) accessories for finished floor; (4) tools. —**General Electric Co., Bridgeport, Conn.**

Airports

Grade Them Quickly and Economically... with ADAMS EQUIPMENT

IN THE vast airfield development program of the Army and CAA, hundreds of Adams machines are engaged in the necessary grading and all-around construction . . . Adams Hauling Scrapers level the ground on short haul work . . . Adams Elevating Graders cut down the grades on long and wide stretches, loading the material into trucks for use at more distant points . . . Adams Motor Graders build ditches for drainage, level off the cuts and fills, cut the runways to final grade and handle all necessary mixing and laying of black-top, soil-cement or other stabilized materials for use on runways, taxi-ways, and aprons.

No matter what your defense project, if it has road building or earth moving connected with it, see your nearest Adams dealer for any needed grading equipment. Wherever you are or wherever you go, Adams co-operative service is near at hand.

J. D. ADAMS COMPANY, INDIANAPOLIS, INDIANA

Sales and Service Throughout the World

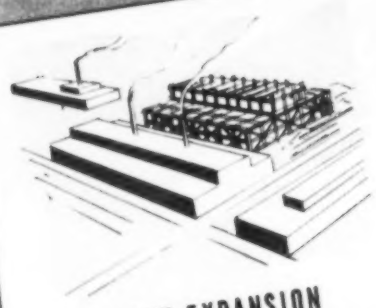
ABOVE: *Adams Heavy-Duty Motor Grader (Diesel) grading runways on a California airport . . . A 12½-yd. Adams Hauling Scraper leveling grounds for an Oklahoma airport.*
BELOW: *An Adams Elevating Grader cutting grounds to grade on a large Alabama airport.*

USE THESE ADAMS MACHINES—Motor Graders in six models, Leaning Wheel Graders, Elevating Graders, Hauling Scrapers, Tamping Rollers, etc.

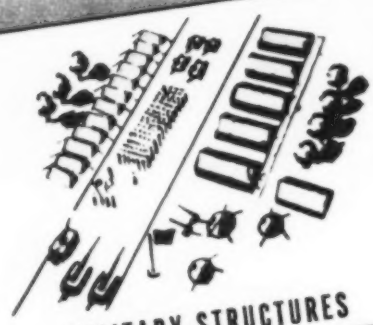
ON THESE DEFENSE JOBS—Airfields, camps, defense building sites, ammunition dumps, access roads, etc.

ADAMS
ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

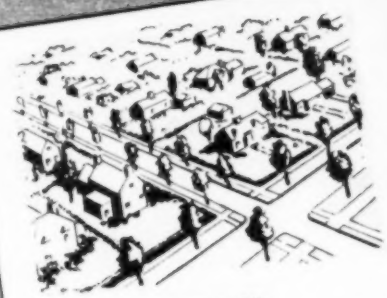
Your War Time JOB SCHEDULE



PLANT EXPANSION



MILITARY STRUCTURES



HOUSING

MAINTENANCE

ROADS

AIRPORTS

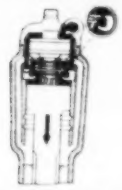
LIGHT POWERFUL

Thor AIR TOOLS

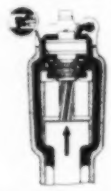
"THE AIR TOOLS WITH THE EXTRAS!"

Light, powerful Thor Air Tools provide the *fastest way* of doing scores of construction jobs from driving a spike to sinking a hole through solid rock. They drill, cut, demolish, dig, saw, pump, grind in a fraction of the time taken by tedious hand methods or by tools ill suited for the job. For Thor tools are "The Air Tools with the *Extras!*" The *extra power* that boosts output . . . the *extra handling ease* that cuts fatigue... the *extra operating efficiency* that spells profits. Put them to work now!

Thor short travel tubular valve boosts output, speeds work



Power Stroke



Return Stroke

An Exclusive Feature of Thor Air Tools

The Thor Short Travel Tubular Valve, operating with split second accuracy, exactly measures the quantity of air admitted through openings held to a tolerance of .00025 of an inch. Because of perfect timing the exhaust port is always cut off before the valve opens. No air is wasted. The rapid action enables Thor tools to get the maximum power from every foot of air.

Thor *Portable Power Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

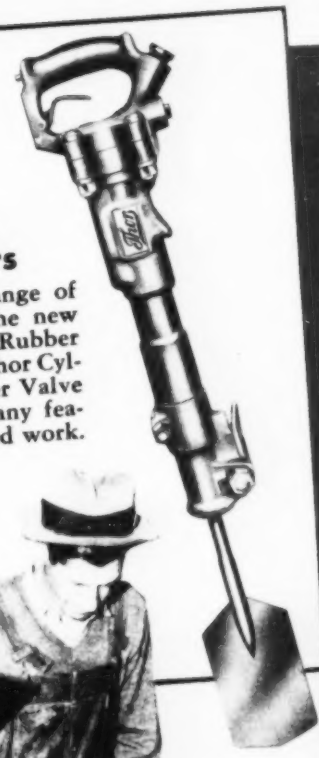
Branches in Principal Cities

Paving Breakers

Three Thor models in 32, 59, and 84 pound weight classes for light and heavy duty. Rugged, alloy-steel, drop-forged construction. Rubber grip handles. Short travel tubular valve. Latch type steel retainers.

Rock Drills

There are thirteen different models of Thor Sinkers, Stoppers and Drifters. Light, medium and heavy duty types. Available for wet and dry operation.



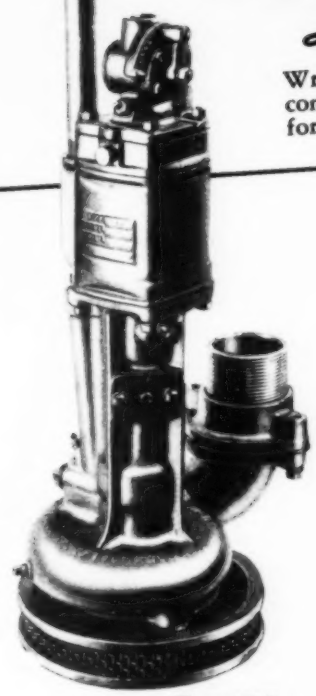
Clay Diggers

A complete range of six models. The new Thor Pigtail Rubber Bumper and Thor Cylindrical Rocker Valve are two of many features that speed work.

DO YOUR JOBS THE FAST WAY!

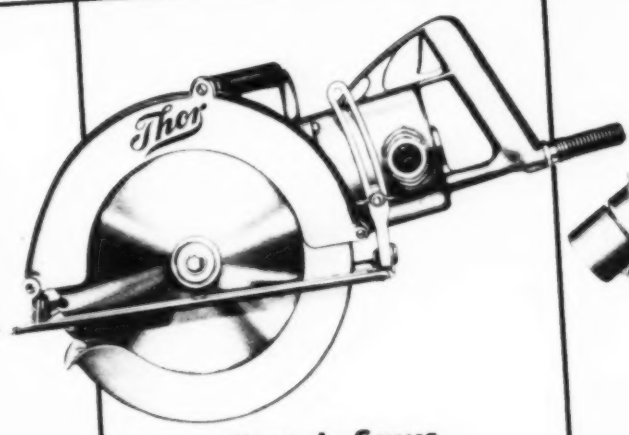
Here's Help For You!

Write for Thor catalog 42, giving helpful, complete information on all Thor Air Tools for construction and mining.



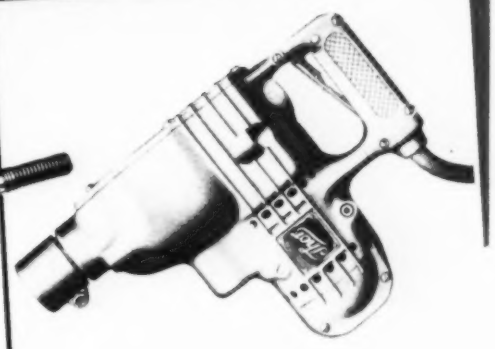
Sump Pumps

Self-priming, centrifugal impeller type pumps that operate efficiently under the most unfavorable conditions. Variable speed throttle. Automatic lubrication.



Electric Saws

Seven powerful models in 6, 7¼, 8¼, 9, 10, and 12 inch blade sizes, for cutting and grooving in wood, stone, metal and compositions. Adjustable for depth or bevel cutting. Safety assured by automatic or gravity-operated guards.



Electric Hammer

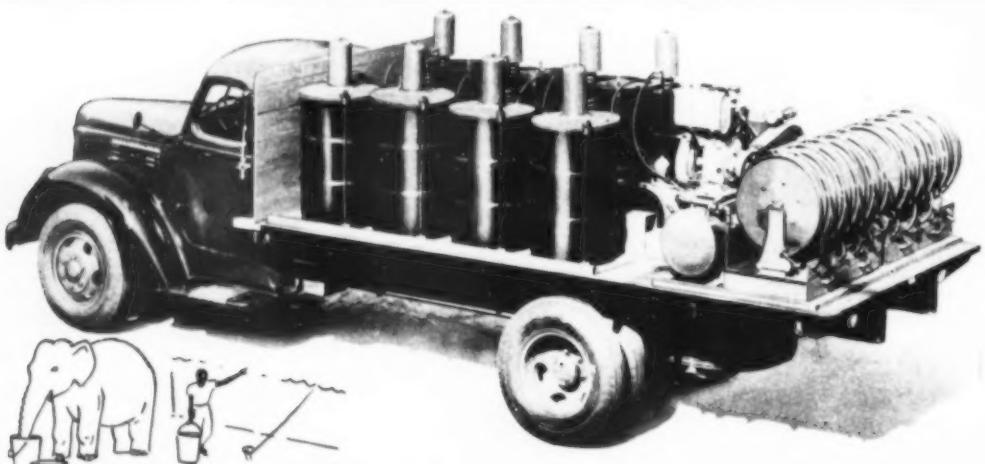
A light, powerful tool that speeds up star drilling, chipping, cutting, channeling, and scores of other jobs in stone, wood and metal. Exclusive Thor "Sling-Shot Drive" gives this "Thor-Nado" Hammer a blow more powerful than any hammer of comparable size.

FOR CLAMSHELL DIGGING

Power to grab a boulder and tear it loose. Weight to penetrate and bite out a full pay load. Watch 'em work—or ask any man who owns one. All sizes available. Wire or write for prices. Descriptive Bulletins on request.

In stock at New York, Hartford, Philadelphia, Charlotte, Richmond, Baltimore, Atlanta, Birmingham & Los Angeles

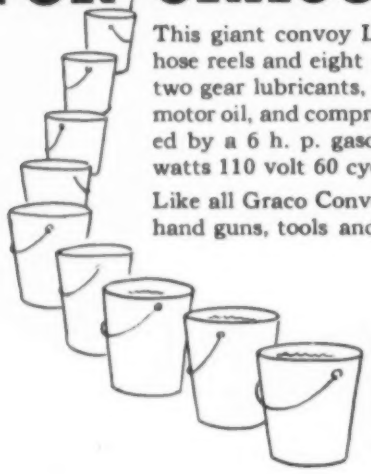
GEORGE HAISS MFG. CO., INC., 139th ST. & CANAL PLACE, NEW YORK—DISTRIBUTORS EVERYWHERE



NO LUBRICATION JOB TOO BIG FOR GRACO CONVOY LUBERS

This giant convoy Luber was custom built for a big defense job. With 10 hose reels and eight powerful lubricant pumps it dispenses chassis lubricant, two gear lubricants, track roller lubricant, hydraulic hoist oil, three grades of motor oil, and compressed air. It employs a 16 cubic ft. air compressor powered by a 6 h. p. gasoline engine. An auxiliary lighting plant furnishes 1000 watts 110 volt 60 cycle current for lighting night operations.

Like all Graco Convoy Lubers this unit is shipped complete with all necessary hand guns, tools and accessories in convenient drawers at the rear of the unit.

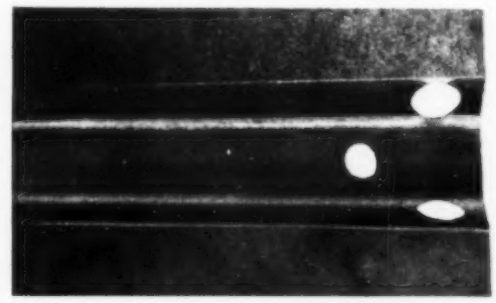


GRACO

GRAY COMPANY, INC.

Minneapolis, Minn.

ASPHALT MASTIC BOARD CENTER STRIP for longitudinal and contraction joints in concrete highway and airport runway construction is offered in designs conforming to current standards and is available in any required lengths already punched for



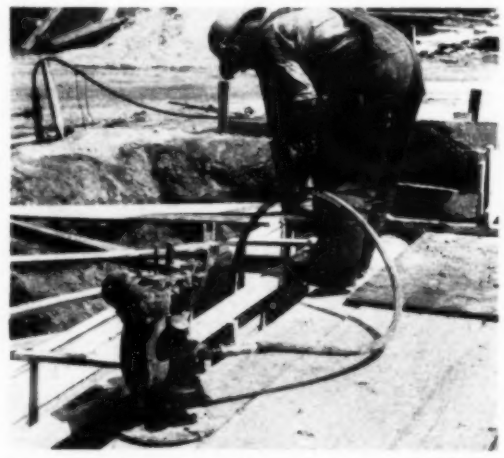
dowel pins and stake holes. Not offered as substitute for steel center strips, but as product for use in longitudinal and contraction joints now and after "duration." Center strip said to have high tensile strength facilitating handling on job and providing waterproof seal between slabs. Claimed not to rust or deteriorate after years of service — **Keystone Asphalt Products Co., 42 E. Ohio St., Chicago, Ill.**

★ ★ ★

PORCELAIN ENAMELED CORRUGATED ROOFING AND SIDING, named Porcelok, is said to be original interlocking design of corrugated steel coated on all surfaces with porcelain enamel. Completely inorganic,—fused to its metal base at 1,600 deg. F.—porcelain enamel is said to withstand for centuries ravages of time and persistent erosive attacks of elements. Features: (1) Economy—no allowance for side laps; (2) no exposed fastenings—because of interlocking design, fastenings of each sheet are completely covered by next one and tight, weatherproof joint is assured for entire length of every sheet; (3) quick erection from outside only — no inside scaffolding; (4) completely engineered to fit every job. Sheets for use with steel framing vary in lengths up to 12 ft. and are precut to size. Sheets for fastening to wood purlins or sheathing are available in lengths from 4 ft. 6 in. to 10 ft. 6 in. by intervals of 6 in. They are adjustable for 6-, 5- or 4-in. head lap and are suitable for roofing and siding. All Porcelok sheets are 25¾ in. wide overall and expose 24 in. to the weather. Colors: economy blue, stipple, powder blue and forest green, outside; blue black, inside. Standard finish is gloss. — **Porcelok Co., Clyde, Ohio.**

★ ★ ★

PORTABLE GASOLINE ENGINE, known as "Jack-of-all-trades" for use in concrete vibrating and surfacing, sawing, sanding, wire brushing, grinding, drilling in wood, brick, concrete, iron or steel and pumping, weighs 55 lb., may be picked up and carried by one man, placed on scaffold and used in close quarters. Said to do away with electric



current worries such as burn-outs, drops in voltage or stringing of lengths of electric cord to spot where work is to be carried on. Powered by single-cylinder, 4-cycle, air-cooled gasoline engine. Anti-creep round, 360 deg. swivel base mounting with carrying handle, wrench and spindle bracket. Shaft, 7/16 in. in diameter by 12 ft. long. Continuous internal bearing type flexible shaft housing. Vibrator attachment, 2⅛-in. diameter, 14 in. long.—**Mall Tool Co., 7740 S. Chicago Ave, Chicago, Ill.**

UP goes the Bucket

FOR FASTER WORK— LOWER COSTS!

- *Bucket Hangs Vertically at Any Angle of Boom!*
- *Standard or Special Buckets Available!*
- *Tilt at Any Angle up to 45 Degrees!*
- *Single Drum 27-E or 34-E Sizes!*
- *30 and 35 Foot Booms!*
- *Rugged — Stable Fast!*

Above: *The Corbetta Construction Co. made things hum on the Gowanus Parkway, Brooklyn, with a MultiFoote 27-E Inclined Boom Paver with a 35-ft. boom tilted at 45 degrees.*

with the MultiFoote Inclined Boom Paver

MULTIFOOTE Inclined Boom Pavers give you flexibility to handle a broad range of general construction work as well as any road paving job. They give you plenty of height and plenty of reach for feeding concrete pumping machines and hoppers, and for pouring between forms. They're rugged and stable so that your operators can work fast without trouble. They offer you all the proved MultiFoote features—double cone drum, no-pressure water system, simple mechanisms, high operating platform, fast charge and discharge, and a host of other advantages.

Plan now to have the speed and versatility of MultiFoote machines on all of your contracts. Write direct or ask your Foote dealer for details.

THE FOOTE COMPANY, INC.
Nunda • New York

ADNUN BLACK TOP PAVERS MULTIFOOTE CONCRETE PAVERS

The M·S·A
Combination
SKULLGARD WELDING SHIELD

EVERYWHERE welders work in the intensive construction programs of today, this modern protective M.S.A. combination brings new safety, comfort and efficiency to the job!

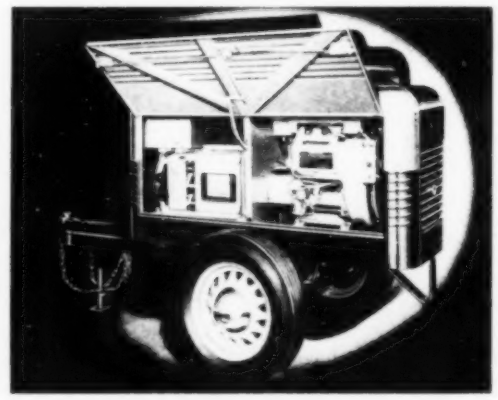
Joining the proved head protection of a tough Skullgard cap with the safety of a tilting, one-piece welding shield, the unit guards heads from falling or flying material and eyes from harmful welding rays. The welding shield may be detached at will and the Skullgard cap worn separately for other work. Ask for descriptive Bulletin No. CE-9.

MINE SAFETY APPLIANCES CO.
BRADDOCK, THOMAS AND MEADE STREETS • PITTSBURGH, PA.
REPRESENTATIVES IN PRINCIPAL CITIES

MOTOR ASSEMBLY UNIT for use in placing high tensile inner rods includes self-centering adjustable sliding members mounted on 2x8-in. plank aligned with motor chuck, rotation of which spins clamp units together. Chuck has rubber grip center which clamps rod unit by friction from end thrust.—**Williams Form Engineering Corp., Grand Rapids, Mich.**

★ ★ ★

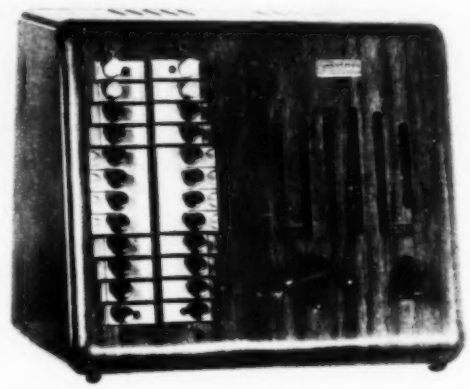
TWO NEW GASOLINE-DRIVEN WELDER UNITS with capacities of 15 to 200 amp. and 30 to 260 amp. respectively are said to be suited ideally for portable use because of their wide welding ranges, single current positive power controls and mobility. Equipped with self-contained welding generators and powered by direct-connected, heavy-duty 4-cycle, 4-cylinder, V-type Wisconsin gasoline engines. Mounted on pneumatic-tired trailers with low



centers of gravity which permit towing at normal traffic speeds. Hinged side panels allow ready access to generator and engine and, when desired, panels may be swung up and locked in place like automobile trunk doors. Under canopy recessed compartments provide room for storage of cables, operators' tools, welding rod and other necessities. Locks protect equipment from theft. Other features: All-welded steel channel base construction and telescopic supporting stand which assures ample support of welder unit when standing alone.—**The Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.**

★ ★ ★

HIGH-POWERED COMMUNICATOR, for contacting selectivity up to 20 substations or paging all such stations simultaneously, makes two-way conversations instantly possible. Substations may be private or remote, permitting conversation with man many



feet from his station. Superpowered and directional trumpet-type substations are available for noisy locations or long-range sound coverage. Earphones may be used with this model, providing confidential reception of incoming messages. Station stands 10 in. high, 12 in. wide and 9 in. deep and is housed in acoustically designed hand-rubbed walnut finished cabinet with Bakelite knobs and push buttons. — **Executone Corporation, 415 Lexington Ave., New York City.**

How to Lop Time Off Schedules

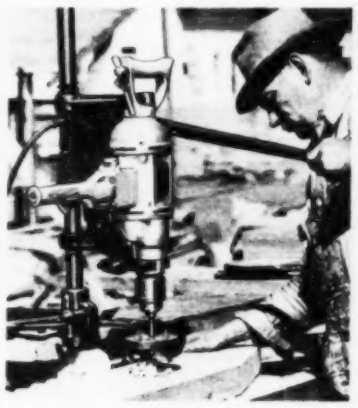
Even if your crews are Short-Handed

BLACK & DECKER ELECTRIC TOOLS are being widely used by contractors, to offset the shortage in man power. With powerful, fast and dependable Black & Decker Tools in their hands, your crews get more work output — easier, faster, better and with less fatigue. Typical of the many time-saving Black & Decker Tools on projects are Portable Electric Saws, Electric Hammers, Heavy-Duty Drills and Electric Nut Runners.

You can obtain these urgently needed tools right where your projects are located — from leading distributors in all principal cities. And, contractors can keep their electric tools in constant service, by prompt repairs from Black & Decker's 26 Factory-owned Branches located coast-to-coast. Ask your jobber to demonstrate how you can save time and costs — or write to: The Black & Decker Mfg. Co., 759 Penna. Ave., Towson, Md.

B & D ELECTRIC HAMMER delivering fast, smashing blows to save hours in drilling concrete. They also vibrate concrete, gouge and shape timbers, channel, caulk, chip and demolish.

ELECTRIC "QUICK-SAW" cutting heavy roof trusses 10 times faster than hand. This is one of the four powerful Black & Decker Electric Saws for clipping time off jobs.



HEAVY-DUTY ELECTRIC DRILL mounted on drill stand speeds up fabrication of timbers at a large Army camp. Black & Decker makes a husky Drill model for every purpose.

ELECTRIC SAWS save time and costs, when all concrete form panels are pre-cut by these fast Black & Decker Tools. They zip through lumber, composition — most any material.

ELECTRIC NUT RUNNER tightening flange plate on heavy structural timber. Black & Decker builds a model to speed up every assembling operation in wood or steel.

HOW TO MAKE YOUR TOOLS LAST FOR "THE DURATION"

GET FREE BOOKLET

"Proper Care of Electric Tools"

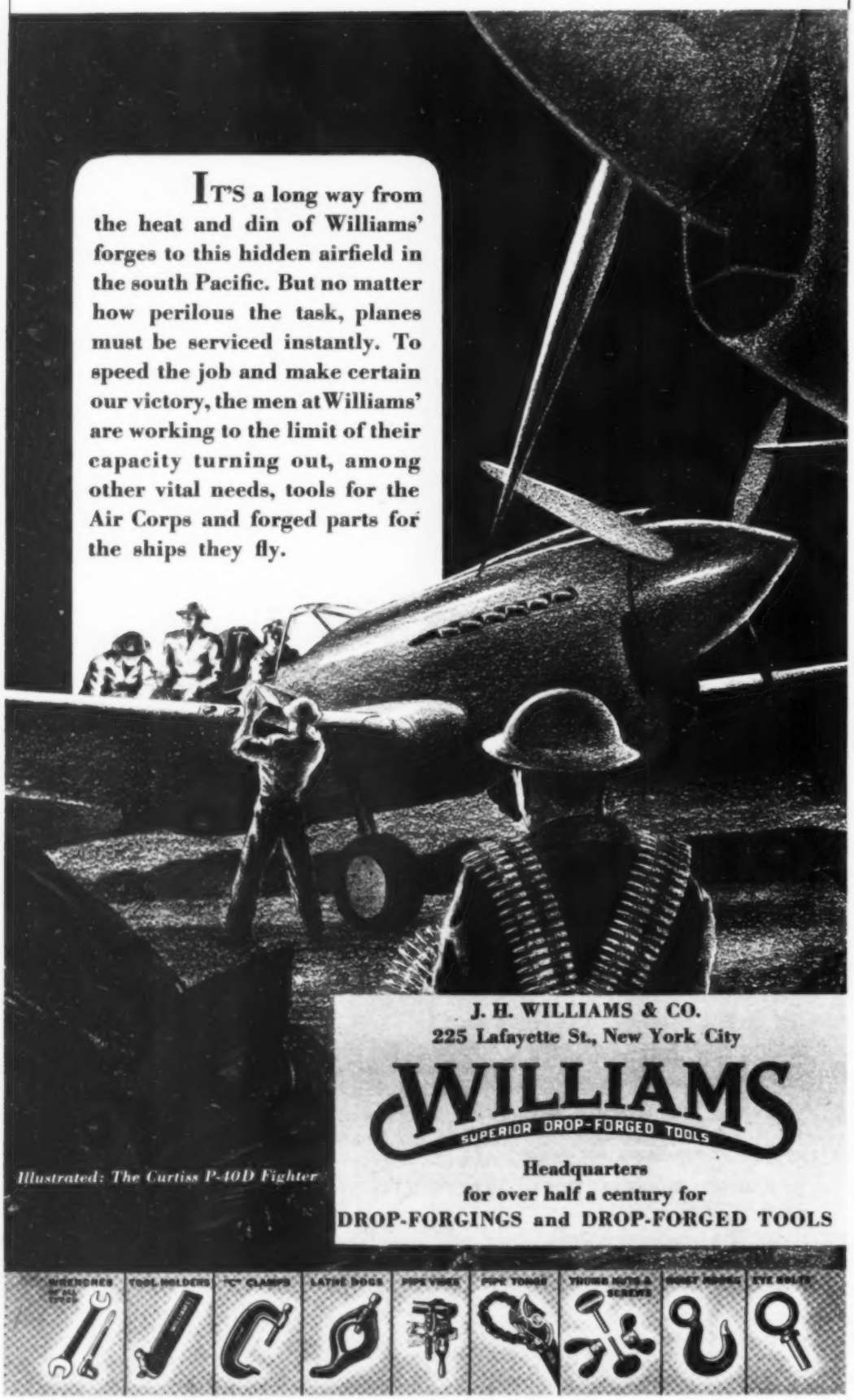
This handy booklet shows how to get longer life and smoother performance from your Black & Decker Electric Tools. Good tools deserve good care — and this booklet is packed with useful tips.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

FED BY THE FORGE OF FREEDOM



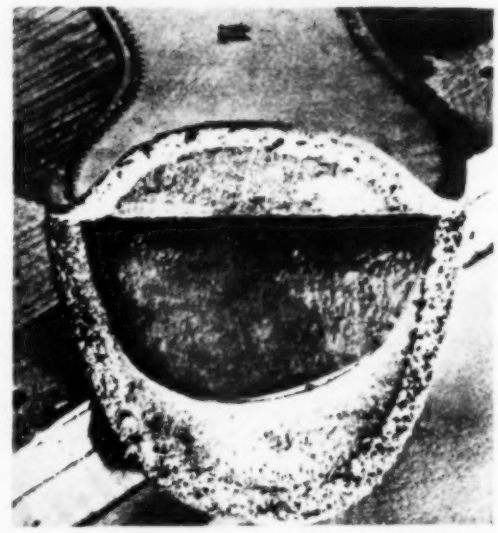
IT'S a long way from the heat and din of Williams' forges to this hidden airfield in the south Pacific. But no matter how perilous the task, planes must be serviced instantly. To speed the job and make certain our victory, the men at Williams' are working to the limit of their capacity turning out, among other vital needs, tools for the Air Corps and forged parts for the ships they fly.

Illustrated: The Curtiss P-40D Fighter

J. H. WILLIAMS & CO.
225 Lafayette St., New York City

WILLIAMS
SUPERIOR DROP-FORGED TOOLS

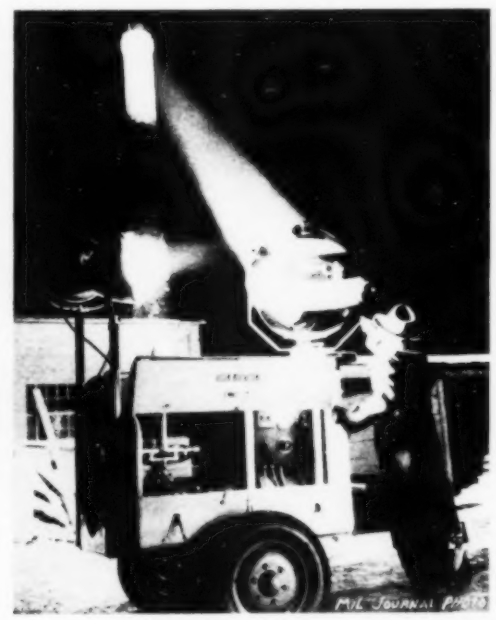
Headquarters for over half a century for DROP-FORGINGS and DROP-FORGED TOOLS



SAFETY INNER SOLE, consisting of flexible steel sheet between two layers of high-grade leather, is claimed to reduce compensation rates by practically eliminating foot injuries due to nail punctures. Sold in pairs in sizes to fit all boots and shoes.—**Goodall Rubber Co., Inc., 36th & Market Sts., Philadelphia, Pa.**

★ ★ ★

PORTABLE SEARCHLIGHT, named "Nite-Hawk," fully self-contained source of light, has 24-in. unit with 3½ million candlepower and throws beam of light 1 mi. Two 30,000 candlepower wide-angle floodlights also are mounted for use as auxiliary or general lighting. If desired, more powerful searchlights may be used, with candlepower up to 9,500,000 and effective lighting ranges up to 3 mi. Ability to throw long, concentrated beam of light said to make it ideal for laying stretch of pipe, for illumination on cut and fill work or for building. Airports are using it as emergency lighting unit to



bring in planes. In case of air attack, municipalities expect to find it useful in keeping enemy planes high enough to make bombing inaccurate. Other possible users: harbor, port and dock authorities, police and fire departments, factories, public utilities, railroads, petroleum industries, shipyards, mining and logging operators and government for airport, military and naval operations. Set on two-wheel spring-mounted frame and pneumatic tires, outfit is easily towed by auto or small truck. Third retractable wheel allows unit to be wheeled easily into position by operator. Power for searchlight is supplied by air-cooled 14-hp. Le Roi engine equipped with electric starter. Self-regulating 5,000-watt d.c. generator, connected to engine delivers direct current at 110 to 120 v. Voltage is adjustable by rheostat located on control panel. In addition to providing light, unit has control panel with facilities for operating small hand tools, such as electric drills, saws and hammers.—**Lester-Blackstone Inc., Milwaukee, Wis.**

The LIMA 3/4 Yd. SUPER Paymaster

will measure up to your most rigid SPECIFICATIONS

Any way you look at it, the LIMA SUPER-PAYMASTER ¾ yard convertible shovel, dragline, crane, or pull-shovel will measure up to your most rigid specifications, for quality, performance and economical operation.

LIMA

LIMA LOCOMOTIVE WORKS, INCORPORATED

SHOVEL and CRANE DIVISION - LIMA, OHIO, U.S.A.

NEWARK, N. J. NEW YORK, N. Y. DALLAS, TEXAS PHILADELPHIA, PA.
SAN FRANCISCO, CALIF. PORTLAND, ORE. LOS ANGELES, CALIF.
SEATTLE, WASH. SPOKANE, WASH. MEMPHIS, TENN.
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SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS

MIXERS
BATCHERS
PUMPS
SAW RIGS
HOISTS
CARTS
BARROWS

FIRST CHOICE IN CONSTRUCTION EQUIPMENT!

★

DUAL PRIME *CENTRIFUGAL* PUMPS!

Faster, surer priming saves delays, speeds up work.

A COMPLETE LINE FROM 1½" TO 10"!

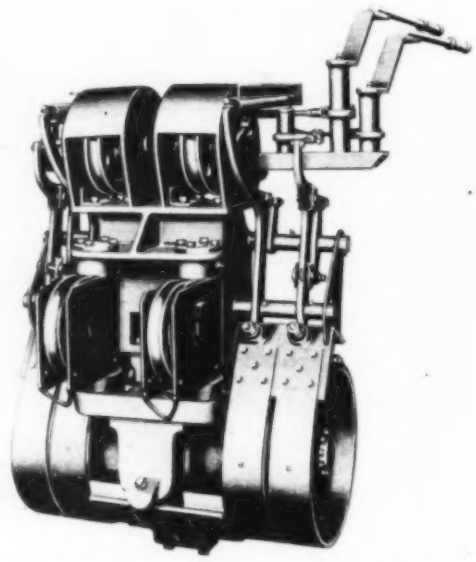
Big CMC Dual Prime on foundation well point job.

SATISFIED CONTRACTOR SAYS: "CMC" Pump and points handled entire job faster and better than any system previously used on this kind of job."

Get facts on CMC exclusively "Double Priming" before buying any pumps.

CONSTRUCTION MACHINERY COMPANY
WATERLOO, IOWA

IMPROVEMENT IN DESIGN of control levers and linkage on heavy-duty power control units for Allis-Chalmers, Cletrac and Caterpillar tractors incorporates relocated horizontal control levers which are



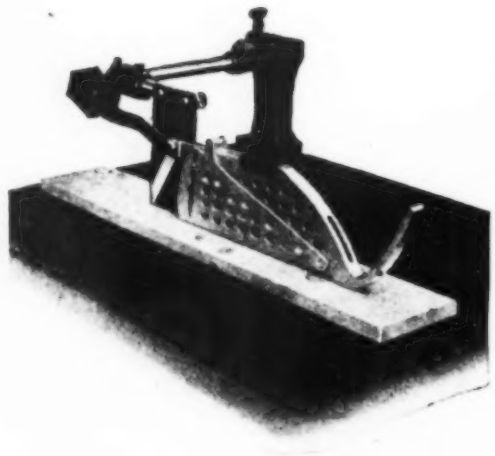
placed within easier range of operator, better leverage and simpler and more positive operation. Fair lead swivel sheaves have been lowered, thus bringing direct line pull closer to tractor drawbar and resulting in better tractor balance. Complete control lever and linkage assemblies are interchangeable with older style mechanisms and are available for replacements.—**The Buckeye Traction Ditcher Co., Findlay, Ohio.**

★ ★ ★

BLACK-OUT PAINT, termed "Valdura Black-Out," for use in darkening windows and sky lights of industrial and commercial buildings is marketed in paste form and when cut 50 percent with water may be sprayed or brushed on windows to prevent all passage of light. Coverage, 800 sq. ft. per gal. Dries within 40 min., providing flat surface that will not flash back or glare. For interiors single coat may be covered with white paint where large glass surfaces make higher reflection properties of white surface necessary. Removal may be made, according to producers, without damage to glass. Packed in 1- and 5-gal. containers.—**American Marietta Co., 43 E. Ohio St., Chicago, Ill.**

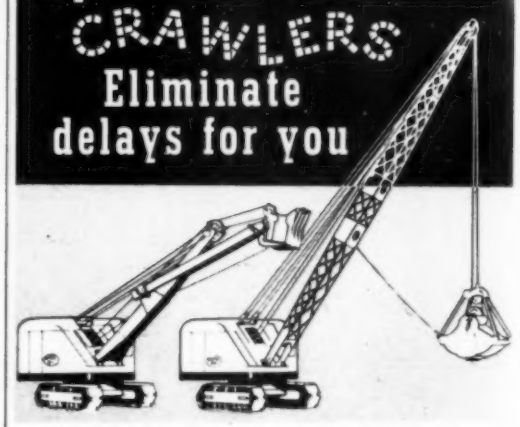
★ ★ ★

AUTOMATIC SAW GUARD offers following features: (1) may be mounted to permit use of entire table top area; (2) double-action shields provide maximum protection during all phases of operation; (3) splitter located directly behind saw prevents bind-



ing; (4) non-kick-back fingers prevent material from climbing saw and striking operator; (5) suitable for stationary or tilting tables; (6) sturdy construction said to eliminate practically all vibrations; (7) steel backbone prevents injury in event of saw breaking; (8) lowers insurance costs; (9) claimed to increase production; (10) may be had for saws up to 30-in. diameter.—**Flohr Manufacturing Co., 2221 Elmwood Ave., Buffalo, N. Y.**

Byers *SELF-CLEANING* CRAWLERS Eliminate delays for you



● Byers crawler pads don't bind, buckle or bog down because they are *really* self-cleaning. Wherever you see crawler treads with only one big center lug on each tread . . . and that lug tapered in all directions to fit an equally open simple end-sprocket . . . then you can be sure the treads are really self-cleaning. And 9 times out of 10 they will be Byers treads.

This is another reason why you should investigate Byers.

11 FULLY CONVERTIBLE MODELS IN 3/8-1/2-5/8-3/4 YD. SIZES

Modern CRANES and SHOVELS

BYERS
RAVENNA, OHIO

National Carbide Floodlights

VALUABLE IN PEACETIME A NECESSITY NOW

NC 200

FOR ALL PURPOSES WHERE FLOODLIGHTS ARE REQUIRED.

Simple In Construction
Economical In Cost
Dependable In Operation

Available in 1500, 8,000 and 16,000 candlepower units.

Write today for literature showing entire lines of Floodlights and Lanterns.

NATIONAL CARBIDE CORPORATION
60 E. 42nd St., New York, N. Y.

ENGINEERING MODEL VARI-TYPER for handling dimensioning and writing of specifications on tracing paper consists of basic part of standard Vari-Typer office machine equipped with changeable type faces and built to handle tracing cloth or tracing paper up to 12 ft. in length. Elimination of lettering specifications and plans by hand is said to save 60 percent of draftsman's time.—**Ralph C. Coxhead Corp., 333 Sixth Ave., New York City.**

★ ★ ★

ASPHALT-COATED CORRUGATED STEEL SHEET, known as A.P.S., to replace galvanized iron (now difficult to obtain) for roofing and siding in industrial construction is uniformly coated on both sides with special composition which, according to claims, gives it unusual durability and protection against extreme range of weather conditions, as well as acid fumes and gases. Said to be ideal for use on industrial plants and for depots, sheds, hangars and other buildings of this type. Another advantage: economy of maintenance as it requires no paint or other finish. Available in following stock sizes; standard corrugation, 2½ in.; gages, 20, 22, 24, 26; widths, 33 and 34 in.; lengths 6 to 12 ft. flat sheets, gages 20, 22, 24, 26; widths 36 in.; lengths, 6 to 12 ft. Manufactured by Protected Steel Products Co., of Pittsburgh, Pa.—**Distributors, Levinson Steel Sales Co., 33 Pride St., Pittsburgh, Pa.**

★ ★ ★

MULTIPOINT CANT HOOK consists of an arm with six small points so arranged that they are said to provide maximum safety in gripping poles or timbers without injury to wood or production of deep holes which harbor moisture and start decay of wood. Claimed to have several mechanical advan-

tages over single point hook: (1) Applied force is distributed over relatively large area and therefore provides safe grip; (2) since maximum possible penetration is less than ½ in., hook is self-releasing; when breaking deck or pile of poles, danger of injury to operator is eliminated; (3) because penetration of wood is limited to less than ½ in., preservation treatment of poles is uninjured; (4) multi-fin toe ring, together with multiple points on arm provides flexibility in handling wide range of pole sizes and is especially adaptable to manipulation of small poles difficult to grip with single point hook; (5) since points are easily replaceable, life of hook is much longer than that of single type.—**Joslyn Mfg. & Supply Co., 20 N. Wacker Drive, Chicago, Ill.**

Why continue to cut and bow wire rope, weakening the strands, making serious accident possible?

Use the Safety Clip. It can't be put on wrong — inexperienced workers can't cause the dangers of the U-Bolt put on backward. The Safety Clip takes a powerful, all-round Fist-Grip on rope. The four flat bearing surfaces far out-hold the finger-pinching U-Bolt Clip, and cannot crush and crimp wire rope.

The Safety Clip Gives More Steel for Armaments!

25% less steel is used in a Safety Clip assembly equal in strength to a U-Bolt-held rope. That steel can go to arsenals and plane factories for all-out military needs. Fewer clips are needed — that saves steel, too. And the rope-ends stay straight and round for re-use — no expensive waste from cut-off crimped-up rope ends.

THESE ARE YOUR SAFETY SAVINGS

No rope crimping or bowing.....rope saved
No special wrench.....tools saved
Bolts on opposite sides.....tightening time saved
Can't go on wrong.....accidents saved
Fewer clips needed.....clips saved
Fewer rope breaks.....accidents saved
No bent, battered threads.....clips saved

95% rope strength delivered by test.

Distributed exclusively through Mill Supply Houses

Look for Laughlin Products in Thomas' Register

THE THOMAS LAUGHLIN COMPANY
PORTLAND, MAINE

PREVENTIVE MAINTENANCE
PROLONGS TRUCK LIFE!

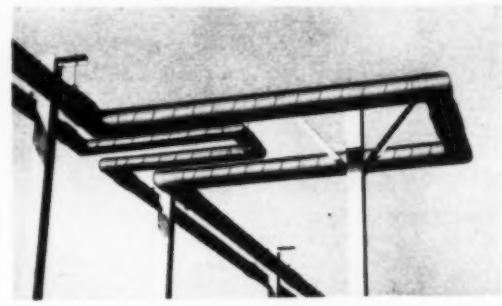
Your General Motors Truck Dealer now offers a new kind of truck-saving service. It's *"Victory Maintenance"* —GMC's scientific answer to War-time needs for more efficient, long-life performance. "Victory Maintenance" employs the principles of preventive maintenance service proved by America's best-managed truck and coach fleets. It introduces new economies in service combinations. It cuts time out for repairs. It reduces upkeep and operating costs. Investigate GMC "Victory Maintenance"— enlist in this patriotic truck-saving, money-saving program today.

Special "Service Payment Plan" available through our own YMAC

THE TRUCK OF VALUE

GMC TRUCKS GASOLINE -DIESEL

OVERHEAD STEAM LINES were installed on defense project recently, using factory prefabricated insulated pipe units, including expansion loops, risers and other special fittings, brought by truck to job. Several units were welded together on ground and these sections then were hoisted into position, eliminating need of raising several single units and attempting



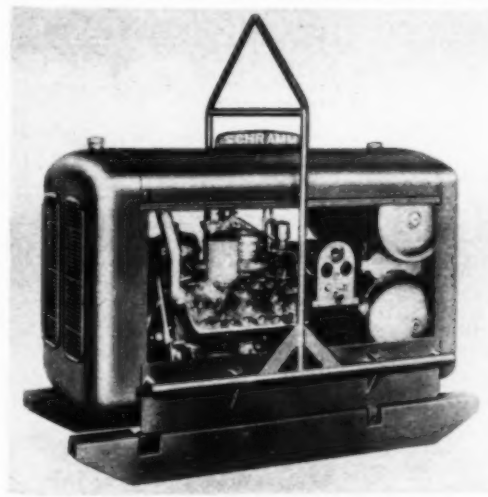
welding overhead. In two working days it is claimed that 1,500 ft. of insulated pipe units were installed in place on channel steel upright supports ready for connector bands and insulation between units. These pipe units installed overhead are said to show negligible deflection. They derive their basic strength from heavy-gage Armco pure ingot iron helically corrugated to add greater strength and formed into cylinder. Lock-seam, parallel with corrugations is formed by rolling over adjacent edges of metal, in itself strong reinforcement, manufacturers claim. Pipe sizes vary from 1 to 10 in. in diameter (standard black steel pipe). Conduit sizes vary from 6 to 14 in.—**Ric-Wil Co., Union Commerce Bldg., Cleveland, Ohio.**

★ ★ ★

GLUE, called No. 123 Adhesive, is used for holding in position Sisalkraft building paper as well as other waterproof sheets applied to wet slab during curing process in concrete construction with brush along laps of waterproof paper producing air-tight bond, preventing quick evaporation of water and producing better concrete. When job is completed, paper blanket is rolled up and re-used on another job. If it tears, patching may be done with glue. Available in 1-, 5- or 55-gal. lots. No. 123 Adhesive may also be used for gluing operations with wood, rubber, metal and insulation materials.—**Midland Glue Products Co., 1478-88 Madison Ave., Detroit, Mich.**

★ ★ ★

SEMI-PORTABLE AIR COMPRESSOR with special skids and lifting hole includes shackle bolt fittings attached to frame with removable wood skids for mounting on chassis, trailer, truck or base. Welded hand rail and lifting bale for easy handling permit compressor to be lifted by crane, hoist or man-power



for truck and mobile power installations. Capacity 60 cu.ft. per min. at 100-lb. gage pressure. With Mercury V-8 engine 4 cylinders are used for power and four for compressing air, thus eliminating all belts, chains and gears or other forms of transmission. Self-contained unit has following additional features: electric self-starting, air and fuel tanks with cooling unit; hood and doors; force feed lubrication, en bloc construction, positive automatic control mechanical intake valves; low fuel consumption and lightweight portability.—**Schramm, Inc., West Chester, Pa.**

DUPONT CONSTRUCTION TOPICS DUPONT

FIRE AT AIRCRAFT PLANT
RETARDED BY "CZC" TREATED LUMBER

As construction progressed on one of the large new aircraft plants, a fire broke out in one of the buildings. The alarm was sounded. Firemen immediately rushed to the scene.

When they arrived, they noticed what was to them a peculiar thing. Parts of the wooden structure had been completely destroyed, while the frame and roof trusses were only charred on the surface — retarding the spread of fire to other sections. Reason — the frame and roof trusses of this structure had been made of wood treated with Chromated Zinc Chloride for speedier construction and to prevent possible decay and termite damage. But another property of "CZC"-treated lumber — its fire resistance — had proved to be a major advantage in delaying the spread of the fire.

Thanks to "CZC", this fire never became a headline story. But it *is* a headline story for construction engineers. Think how important this quality of "CZC"-treated lumber is today in the construction of armories, plane hangars, defense housing projects! Besides assuring safety and strength, lumber treated with "CZC" also permits great speed of construction because it is readily available — an important point to remember when time is at a premium.

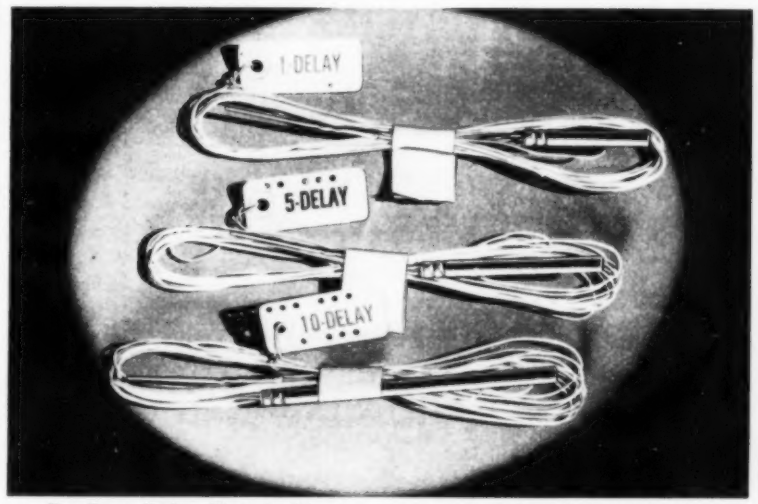
Write today for your copy of the booklet, "Facts about 'CZC'."

Du Pont Delay Electric Caps
Equipped With New Plastic Insulation

Du Pont Delay Electric Blasting Caps — long noted for their high degree of dependability in tunneling and other contracting work — are now equipped with an additional feature for increased reliability.

A new plastic insulation, developed in the du Pont research laboratories and tested under the most severe field conditions, is now standard for leg wires on these Delays. Abrasion resistance of the new insulation is superior to the best impregnated cotton coverings formerly used and electrical properties are equal to those of enameled wire. Furthermore, this new, bright-colored insulation stays clean so that wires are easy to identify under field conditions.

This announcement is made following the dependable performance in the field of several million Du Pont Electric Blasting Caps equipped with the new plastic insulation. This insulation is exclusive with du Pont and is available on all Du Pont Delay Electric Blasting Caps at no additional cost to you.



Du Pont Delay Electric Blasting Caps equipped with new plastic insulation. Note perforated tags (of contrasting colors) for accurate identification of delay periods.

NEW BOOK ON VENTILATION FOR TUNNELS

Safety and construction engineers will find a wealth of useful information in the new "Ventube"* handbook for 1942. This booklet is profusely illustrated, with actual photographs of "Ventube" in use, and also with diagrams indicating recommended use of "Ventube" for best results.

The "Ventube" system of auxiliary ventilation has been widely used in practically every major tunneling job in the last decade, and du Pont research has never ceased in the search for ways of making it more efficient than ever. All of the recent improvements of "Ventube" are covered in this new booklet.

Be sure to send for your copy. Write E. I. du Pont de Nemours & Co. (Inc.), "Fabrikoid" Division, Empire State Building, New York City.

**"Ventube" is Du Pont's registered trademark for its rubber impregnated flexible ventilating duct.*

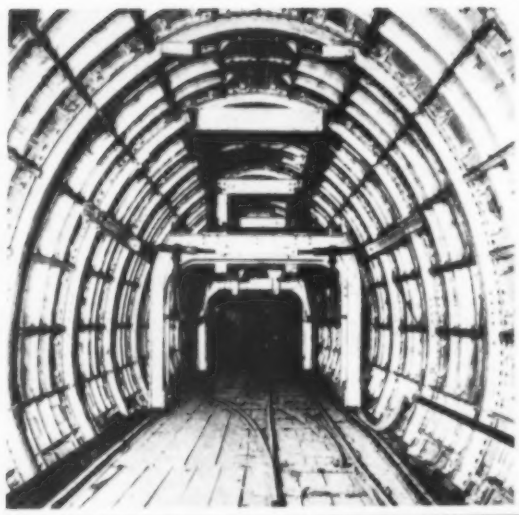
DID YOU KNOW ?

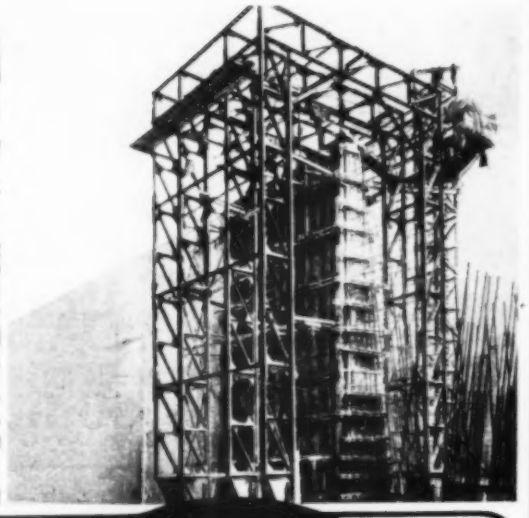
. . . **THAT OVER 4-1/2 BILLION** du Pont regular and electric blasting caps have been sold and used to date

. . . **THAT ONE MAN** in a timbered entry or tunnel can put up over 400 feet of "Ventube" in two hours or less

. . . **THAT TIMBERS TREATED WITH "CZC"** maintain load bearing strength for the normal life of the structure.

★ ★ **E. I. DU PONT DE NEMOURS & COMPANY (INC.) WILMINGTON, DELAWARE** ★ ★





for Economy in Construction

BLAW-KNOX STEEL FORM Engineers offer a consultation service before plans are drawn, with the thought in mind that their specialized knowledge and experience may be of assistance to both engineers and contractors in promoting speed and economy in construction, and securing a superior quality of finished work.

This engineering service is yours for the asking.

BLAW-KNOX DIVISION
of Blaw-Knox Company
Farmer's Bank Bldg. Pittsburgh, Pa.
New York Chicago Philadelphia Birmingham

BLAW-KNOX STEEL FORMS

THE CARE OF LE ROI ENGINES Page 1

How to Get the Most Performance for the Least Money from LE ROI Engines

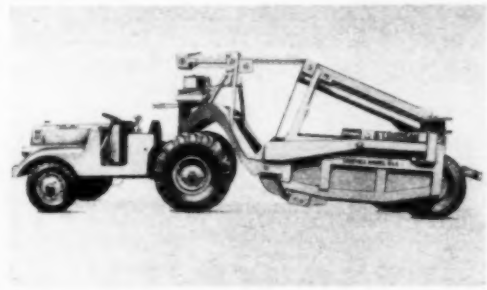
A timely reminder on how to make your present equipment work harder . . . live longer

• *Illustrated above is Le Roi D201.*

"All out" for Victory may mean "fresh out" of Le Roi-powered equipment. There just won't be enough to go around. • Count on Le Rois you now have to see you through. Tough sledding is "duck soup" to them — they have that reputation. • But even the best engines need a regular program of preventive maintenance. So to help prolong the useful life of your Le Roi engines, insist on periodic engine check-ups and servicing . . . on genuine Le Roi replacement parts . . . on adequate lubrication at all times . . . on complete protection against bad weather and tampering. E-8

LE ROI COMPANY • MILWAUKEE, WISCONSIN

CARRYING SCRAPER with rated capacity of 8½ cu.yd. and 11 yd., heaped, is designed for use with new Caterpillar 4-wheel tractor. Has high sides and steep, long blade base which causes material to



boil in, flow back into bowl and forward into built-up apron. Cutting edge is 8 ft. 6 in. With apron cable dead-ended on apron, all hoist and unloading cables are now placed up and out of dirt, eliminating abrasive cable wear. — **R. G. Le Tourneau, Inc., Peoria, Ill.**

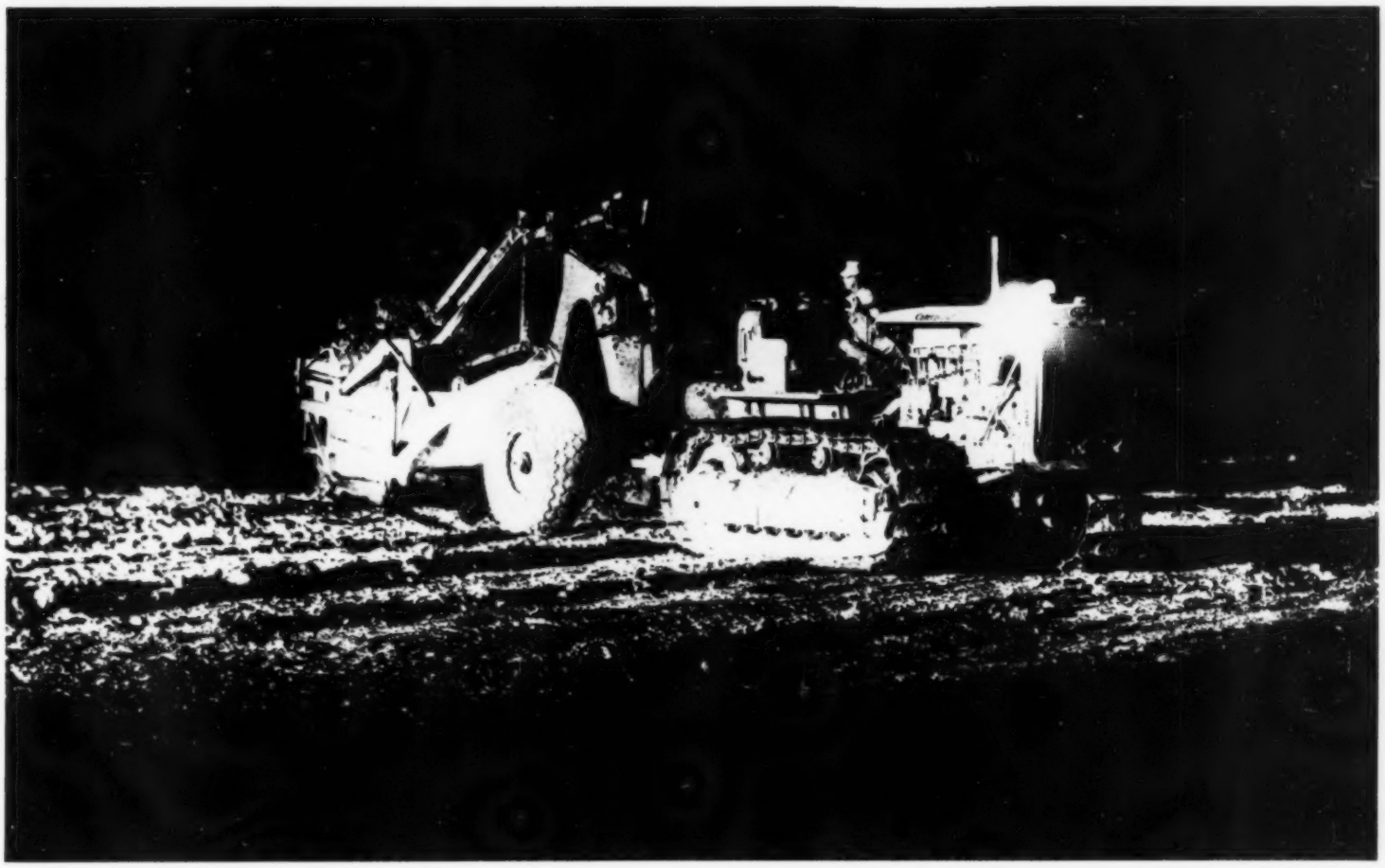
★ ★ ★

PAINT BRUSH CONDITIONER called "Protexem" consists of rust-resisting, lead-coated metal container with airtight cover equipped with special composition cork gasket held in place with clamp. In this container may be hung paint and varnish brushes where they are subject to fumes of volatile liquid dispensed from glass insert and kept in proper condition for use. Protexem liquid said to vaporize slowly, lifting air in container above brushes, to prevent drying and at same time to dissolve paint and varnish clinging to bristles, keeping them soft and pliable. Vapor evaporates when brush is exposed to air and does not leave residue. Said to be less inflammable than solvents ordinarily used with paints. Less than pint of vaporizer is used in container at one time. Claimed not to damage brushes and not to have any deteriorating effect on bristle or setting of brush. Four models available: (1) home unit holds five 4-in. brushes; (2) general use (portable) for six 5-in. and three smaller brushes; (3) shop unit for nine 5-in. brushes and five smaller size; (4) shop storage unit for 24 5-in. brushes.—**Wisconsin Laboratories, Inc., 2324 W. Wisconsin Ave., Milwaukee, Wis.**

★ ★ ★

ROLL MAP CASE, for facilitating handling of large maps, houses and displays maps 8, 10 and 12 ft. wide in continuous rolls up to 250 ft. in length. Maps are joined by zippers. Case is metal throughout and is electrically operated. Maps are housed in insulated storage compartment automatically sealed for

protection of contents from dust and grime. Storage and exhibit rolls are 8 in. in diameter and of non-corrosive material. Front of storage compartment may be raised to drafting board position, providing working surface width of map by 24 in. wide and covered with cork linoleum. Map passes over drafting board in horizontal plane and is held there by 4-in. roller which is automatically raised and lowered through cross connections and switches which control raising and lowering of drafting board. Controls so arranged that travel of map is limited. **Motors Metal Manufacturing Co., 5936 Milford Ave., Detroit, Mich.**



THE "CAT" THAT PURRED 9000 HOURS

NINE THOUSAND hours between overhauls! That would be impressive if it were said about *one* piece of Diesel equipment operating under favorable conditions. Read what Hunkin-Conkey Construction Company says about their experience with RPM Delo in building the U. S. Ordnance plant, Ravenna, Ohio, one of the biggest construction jobs of its kind in the world:

"We have moved in excess of three million cubic yards of dirt, using the following Diesel-powered equipment: 86 tractors, 23 cranes, 11 shovels, 7 locomotives, and 6 power graders. RPM Delo has been used exclusively in every Diesel engine on this job and we have not lost a single bearing in any Diesel.

"Over 30 pieces of Diesel equipment have now passed 9,000 hours of operation, each without an overhaul, and one piece has operated over 10,000 hours and oil consumption is still not excessive.

"Needless to say, we are proud of our maintenance record and are especially pleased with the performance we have had from RPM Delo in our Diesels under severe operating conditions."

At a time when hours are precious, when equipment is almost impossible to replace, Diesel users are swinging more and more to RPM Delo—the oil used by U. S. Navy submarines and approved by the makers of 95% of America's installed Diesel power.

ORDER RPM DELO FOR YOUR DIESELS

RPM Delo is marketed under the following names:

RPM Delo

Calso Diesel Engine Lubricating Oil · Sohio RPM Delo · Caltex RPM Delo Kyso RPM Delo · Signal RPM Delo · Imperial-RPM Delo (concentrate)

Ask your Diesel engine manufacturer or distributor for the RPM Delo supplier in your vicinity.

RPM DELO
REG. TRADE-MARK
DIESEL ENGINE LUBRICATING OIL

STANDARD OIL COMPANY OF CALIFORNIA

PONY

Solid Shank

FEATHERWEIGHT

Shovels

•

PERFECT BALANCE

A new redesigned socket gives to the PONY Solid Shank Shovel the perfect balance which no other solid shank shovel has.

Equipped with

SHOCK BAND

The famous ABW Shock Band gives to the shovel greater handle strength. This is a patented feature of PONY Solid Shank Shovels.

Ask Your Jobber

AMES Since 1774

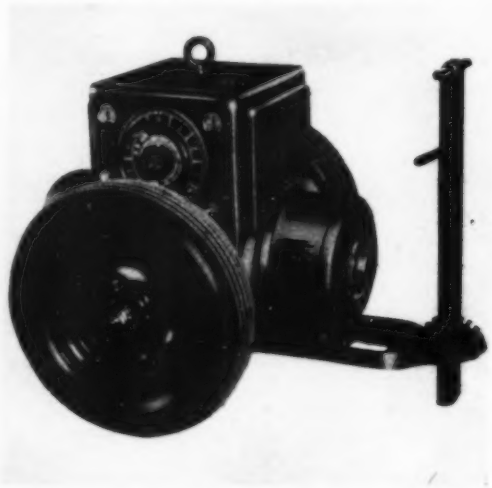
AMES BALDWIN WYOMING CO.

Parkersburg, W. Va. North Easton, Mass.

ABW PRODUCTS

SHOVELS FORKS
SPADES HOES
SCOOPS RAKES
POST HOLE DIGGERS
AGRICULTURAL HANDLES

TWO-WHEELED, LIGHTWEIGHT, PNEUMATIC-TIRED TRAILER for mounting 200-, 300- and 400-amp. electric drive welders is designed for road towing at 35 mph. Three bolts on frame of trailer register



with three holes in legs of welding machine, assuring easy mounting. Combination tow bar and standing support has hand-operated ratchet for locking support arm in position. Unit moves easily because of its low, underslung construction, narrow tread and precision method of balancing. Length, 54-in.; width, 45 in.; height, 27 in. (over tires); 13-in. axle center. Tires are 16x5.50-in., 4 ply. — **Hobart Brothers Co., Troy, Ohio.**

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SHOP TRUCK called "Chore Boy" for rapid handling of loads in industrial plants and warehouses, for general pick-ups and plant deliveries. Weighs 800 lb., has load capacity of 1,000 lb. and loading space of 12.8 sq. ft. Maximum speed 15 mph. Driven by 4-cycle, air-cooled 7.7-hp. engine low in fuel consumption averaging approximately 35 to 38 mi. per gal. of gasoline. Magneto ignition used for

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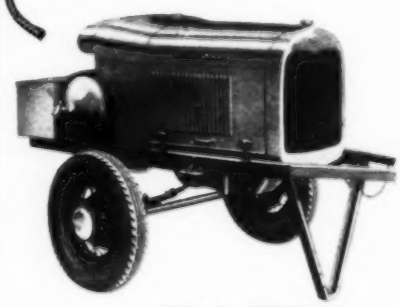

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AIR-CONTROLLED SHOVEL. ¼-cu.yd. unit, available either with conventional crawler mounting or as Mobilcrane with pneumatic-tired wheel mounting, also performs duties of dragline, clamshell, crane and piledriver. Features: (1) Deck of unit cast steel said to provide stronger base for machinery, to lessen vibration and to reduce number of parts; (2) controlled throughout by air (except hoist drum brakes) claimed to assure smooth and easy control of primary motions, saving wear and tear on operating machinery and operator; (3) swing,

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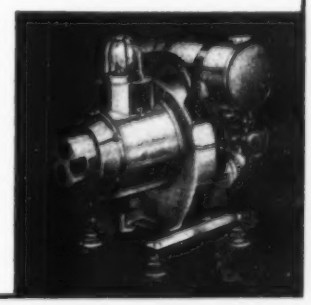

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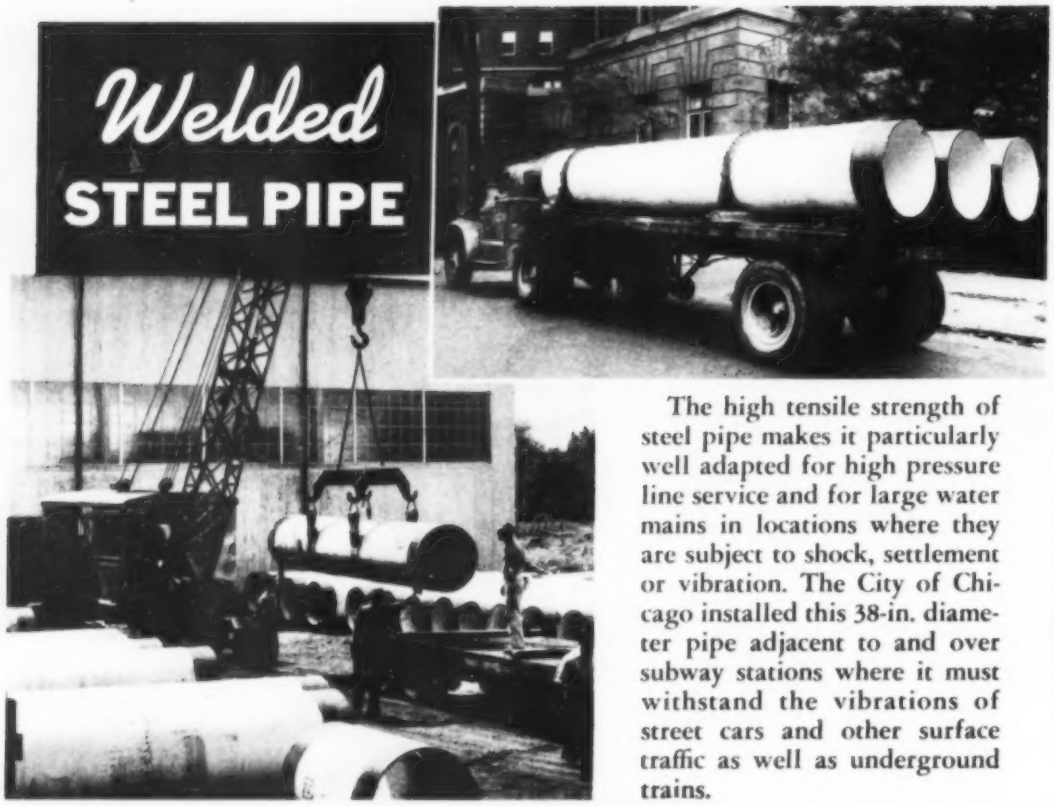

The high tensile strength of steel pipe makes it particularly well adapted for high pressure line service and for large water mains in locations where they are subject to shock, settlement or vibration. The City of Chicago installed this 38-in. diameter pipe adjacent to and over subway stations where it must withstand the vibrations of street cars and other surface traffic as well as underground trains.

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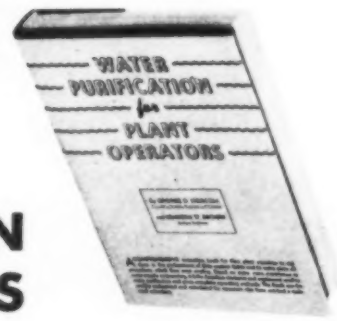

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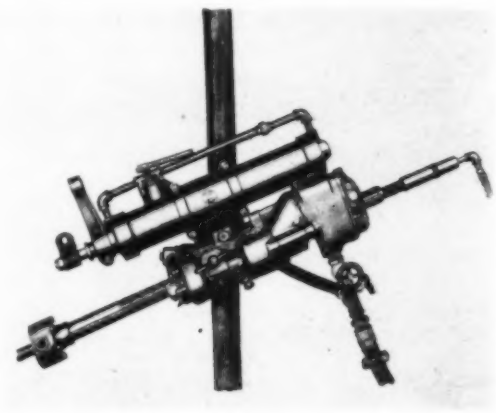

like drifter on any standard saddle; (6) built-in screw feed; four sets feed gears; balanced safety-type chuck—full 24-in. run; (7) high torque, economical, trouble-free vibrationless rotary-type air motor; (8) fully inclosed, dust-proof construction; ball bearings throughout; positive lubrication; (9) high bit speed with stepless throttle regulation—from 0 to 1,500 rpm.; (10) high core recovery and footage per shift; low cost per foot, (11) self-aligning air rod puller available, if desired, for deeper hole drilling. **Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.**

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PORTABLE OZONE UNIT, known as Sterozone, claimed to produce pure, clear, colorless, tasteless, odorless water without use of chlorine or other chemical, has capacity of 1,200 gal. per hr. and can be installed on any tank or water container. For field use 250-gal. canvas bag is available. Power is supplied from 110-v. 50-60-cycle outlet or by portable

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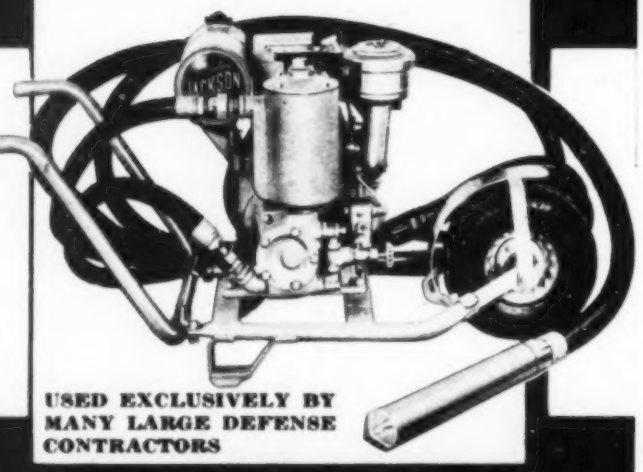

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MANHOLE COVER LOCK is device perfected by John J. Morris, sewer commissioner of Eastchester, N. Y., aided by town councilman William C. Stohldreier, purpose of which is to prevent covers from being removed by unauthorized persons. Consists of

two steel arms that ride on bolt in cover. Attached to toggle rods, arms can be drawn to horizontal position when screw is turned, thus projecting them under manhole frame and securing cover. No one can turn screw to unlock cover unless he possesses special key wrench that fits over bolt. Not only does device prevent theft of covers, according to Mr. Morris, but it stops them from rattling. Claimed to be of particular value in war time efforts to prevent sabotage of utilities.—**Mancolok Co. of America, 31 Mamaroneck Ave., White Plains, N. Y.**

★ ★ ★

Pitfalls in Bidding

Address at meeting of American Road Builders' Association by Walter C. Sadler, Professor of Civil Engineering, University of Michigan, and Mayor, Ann Arbor, Mich.

LAWS OF VARIOUS STATES vary sharply, and this is particularly so in the field of contracts. With the larger contractors traveling indiscriminately across state lines in the prosecution of their work, many potential legal difficulties lurk in bidding for jobs in neighboring states. These practices give rise to certain "Pitfalls in Bidding", which will be examined.

Conflict of State Laws

Three geographical locations are of legal importance in interpreting a contract. First, there is the place where the final act is done in creating the contract obligation — ordinarily the place where the final signature is affixed to the agreement, where the parties did the overt act indi-

(Continued on page 108)

Positive ROLLING EJECTION

CLEAN ★ EASY ★ FAST

In all kinds of dirt—loose or hard-packed, heavy or light, wet or dry—you can rely on Bucyrus-Erie Scrapers to eject their loads cleanly and get rid of them fast.

The dirt is **forced** out of these scrapers by pulling the ejector (a simple curved plate forming the bottom and back of the bowl) forward in an arc to a nearly vertical angle, so that dirt can't possibly stick. Material adhering to the sides is broken loose by wiper bars at each side of the ejector. There is no "dead" pull; the continuous rolling motion lowers resistance of dirt.

Because the dirt rolls out so easily, power demand is low, so low that the ejecting mechanism requires only a two-part line. This means saving time on the dump because dumping can usually be done in higher tractor gears.

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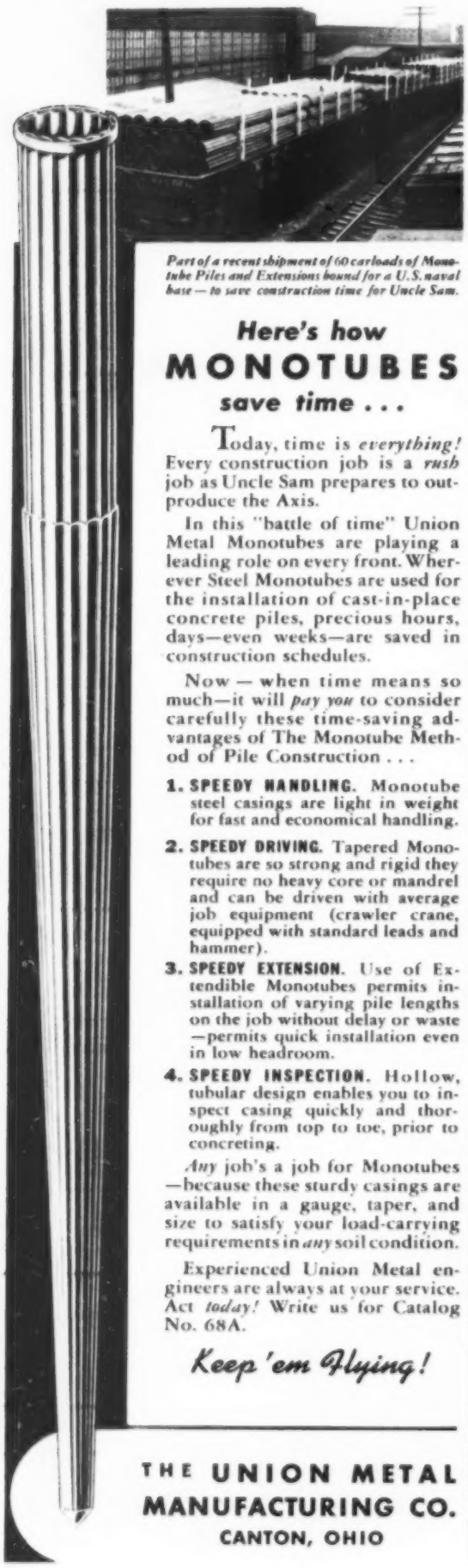
SEE YOUR International TracTracTor DISTRIBUTOR

These EXTENDIBLE MONOTUBES

went to sea to SPEED construction at an important U. S. naval base



Part of a recent shipment of 60 carloads of Monotube Piles and Extensions bound for a U.S. naval base — to save construction time for Uncle Sam.

Here's how MONOTUBES save time . . .

Today, time is *everything!* Every construction job is a *rush* job as Uncle Sam prepares to outproduce the Axis.

In this "battle of time" Union Metal Monotubes are playing a leading role on every front. Wherever Steel Monotubes are used for the installation of cast-in-place concrete piles, precious hours, days—even weeks—are saved in construction schedules.

Now — when time means so much—it will *pay you* to consider carefully these time-saving advantages of The Monotube Method of Pile Construction . . .

1. **SPEEDY HANDLING.** Monotube steel casings are light in weight for fast and economical handling.
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Any job's a job for Monotubes —because these sturdy casings are available in a gauge, taper, and size to satisfy your load-carrying requirements in *any* soil condition.

Experienced Union Metal engineers are always at your service. Act *today!* Write us for Catalog No. 68A.

Keep 'em Flying!

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

(Continued from page 106)

cative of the voluntary meeting of their minds. It is called the place of making. Second, the place where the obligation is to be performed is called the place of performance. Third, the location of the court in which the subsequent litigation is conducted, is the forum.

If all three of these, that is, the place of making, performance and forum lie in the same state, there will be no conflict of laws. However, if these three different functions of the contract occur in different states, difficulties immediately arise. Let us consider a specific example. The Detroit Road Builders, Inc., are low bidders and enter into a contract for the construction of a highway job in Ohio. After some negotiations back and forth, the Detroit Road Builders, Inc., wires from the job at Dayton, Ohio, to the Michigan Supply House in Detroit offering to pay a specific sum for the rental of certain equipment. The Michigan Supply House telephones to Dayton accepting the offer. The contract was made in Michigan, because it was accepted there. It is conceivable that this contract would be invalid in Michigan, because the acceptance was not in writing, although valid in Ohio. If the lawsuit were held in Michigan, both the place of making and the forum would be in Michigan, and the Michigan law of invalidity would control.

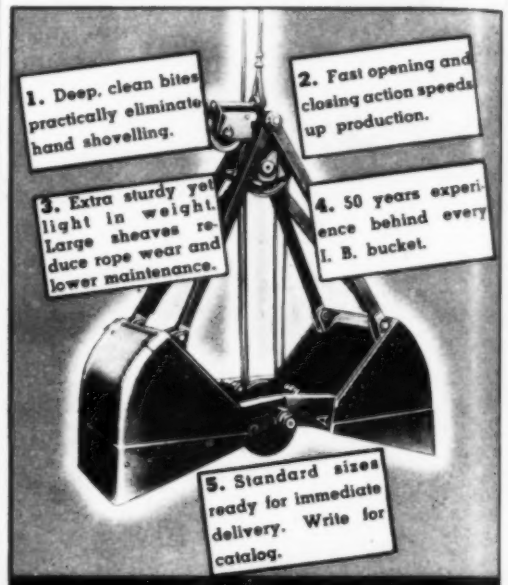
Lawsuit for Rental Fees

Let us consider another phase of this same problem. The general contractor says the equipment is not satisfacory, refuses to pay the rental, and the lawsuit is brought in Dayton for the rental fees. The issue now turns on the performance of the contract, that is the furnishing of specified equipment in a specified condition, and the Ohio law would control in the question of an implied warranty of quality.

It can be stated, generally, that a contract which is valid where made is valid where the suit is tried, that is, at the forum. Thus, if a contract is made in Mishouri, and is valid under the laws of Missouri, it is valid under the laws of any other state in the union where a legal controversy might arise. For instance, the City of Ann Arbor, in Michigan, might desire a sewer system constructed to take raw sewage from the various houses or factories and transport it into the nearby Huron River. If such a contract were fully signed up by the parties at a meeting in Kansas City, the validity of the contract would normally be determined by the laws of Missouri, and if valid there, it would appear to be valid in all of the 47 other states including the state of Michigan where the contract was to be performed. There are some exceptions to this rule, however. If the state legislature of Michigan had previously declared that the dumping of raw sewage into the rivers of Michigan was against the public health, welfare, and safety of the citizens of the state, and had specifically prohibited it, this Kansas City contract was bound to be invalid in spite of its validity in Mis-

5 REASONS WHY

PRODUCTION MINDED MANUFACTURERS DEMAND I. B. BUCKETS


1. Deep, clean bites practically eliminate hand shovelling.
2. Fast opening and closing action speeds up production.
3. Extra sturdy yet light in weight. Large sheaves reduce rope wear and lower maintenance.
4. 50 years experience behind every I. B. bucket.
5. Standard sizes ready for immediate delivery. Write for catalog.

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souri. These exceptions are logical, but they are rare.

How Validity Is Determined

The validity of a contract is determined by the laws of the state where made, and this applies to the interesting case where a road builder signs a contract for cement while on a pullman traveling across the country. The laws of the state where the contract was accepted will control.

Take the case where a California subcontractor gives the bond of the Joplin Mid-West Security Company for the successful performance of its contract in California. The subcontractor defaults, and the general contractor looks to the Security Company. This threatened new obligation precipitates a reorganization of the financially shaky security company, and the general contractor finally accepts fifteen debenture bonds of $1,000 each through a contract executed in St. Louis. When the California general contractor attempts to invalidate his St. Louis contract on the basis that the debenture bonds were void, because not approved under the California Corporate Security Act, he will discover to his disappointment that the St. Louis contract was valid in Missouri, and therefore valid in California. California, like many other states, could have enacted a far more strict law positively prohibiting the satisfaction of any California obligation of this nature which has not been approved under a state corporate security act, but such severe legislation would have certain disadvantages too. The acceptance of the contract was in Missouri, and the Missouri law will be honored in California.

Legal problems in the interpretation of contracts are more liable to arise in the case of those informal subcontracts which have been hastily drawn for materials, supplies and grading jobs, than for the basic contracts. The basic contracts with state highway departments and the larger cities are usually carefully considered and well prepared. In fact the real pitfalls in bidding will lie most frequently in that phase of apparently minor details which are neglectfully handled or ignored entirely. Hastily prepared subcontracts are illustrations.

Workmen's Compensation

The relationship of employer-employee is a fundamental requirement of workmen's compensation statutes. If the injured man is not an employe, he is not under the statute. Suppose a road contractor, who carries workmen's compensation insurance, hires a local pump repair man from a town near the job, and the workman is killed due to the negligence of the road contractor. If the contractor paid the pumpman $1.25 per hour, furnished all materials required, and retained unto himself all means, methods and manner of repairing the pumps, the workman would be merely an employee. However, if the pumpman were an independent contractor, he would not come under the state workmen's compensation statute, and the con-

(Continued on page 110)

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NEW plants, enlarged plants, remodeled plants—they're needed *FAST* for America's victory . . . they're finished *FASTER* when SKILSAW TOOLS are on the job, speeding up building each hour of each day. *Are skilled hands scarcer?* One hand with SKILSAW does the work of ten! *Is time too short?* SKILSAWS cut days from schedules . . . SKILSAW DRILLS punch holes in bottlenecks! *Do you want proof?* 9 out of 10 defense contractors use SKILSAW TOOLS! Ask your distributor for a demonstration.

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The thousands of Marmon-Herrington "Heavy Duty" *All-Wheel-Drive* trucks and converted Fords in the armed forces of America and her Allies are accustomed to "hard going." They won't fail in the jobs ahead of them, no matter how difficult the terrain may be, for they have been *proved* in the most exacting civilian and military services for years before we actually went to war. Building and maintaining roads regardless of weather, clearing snow from the highways, transporting oil equipment across desert sands, in these and scores of other "worst jobs" they have established records of performance that will put them in the forefront of demand, again, when this war is won. Write or wire for literature. Cable address MARTON.

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No mud or snow too deep for the fleet of seven Marmon-Herrington All-Wheel-Drive converted Fords in Ionia County, Michigan.

MARMON-HERRINGTON
All-Wheel-Drive

(Continued from page 109)

tractor might be liable in damages to the widow for a large sum. The distinction between the employee relationship on the one hand, and the independent contractor on the other, lies in the extent of the control by the contractor. And it might be well noticed that the member of a firm, who takes the place of a workman on the job, holds a dual capacity, and if that firm member is injured while so acting, he may be under the act.

Occupational Disease

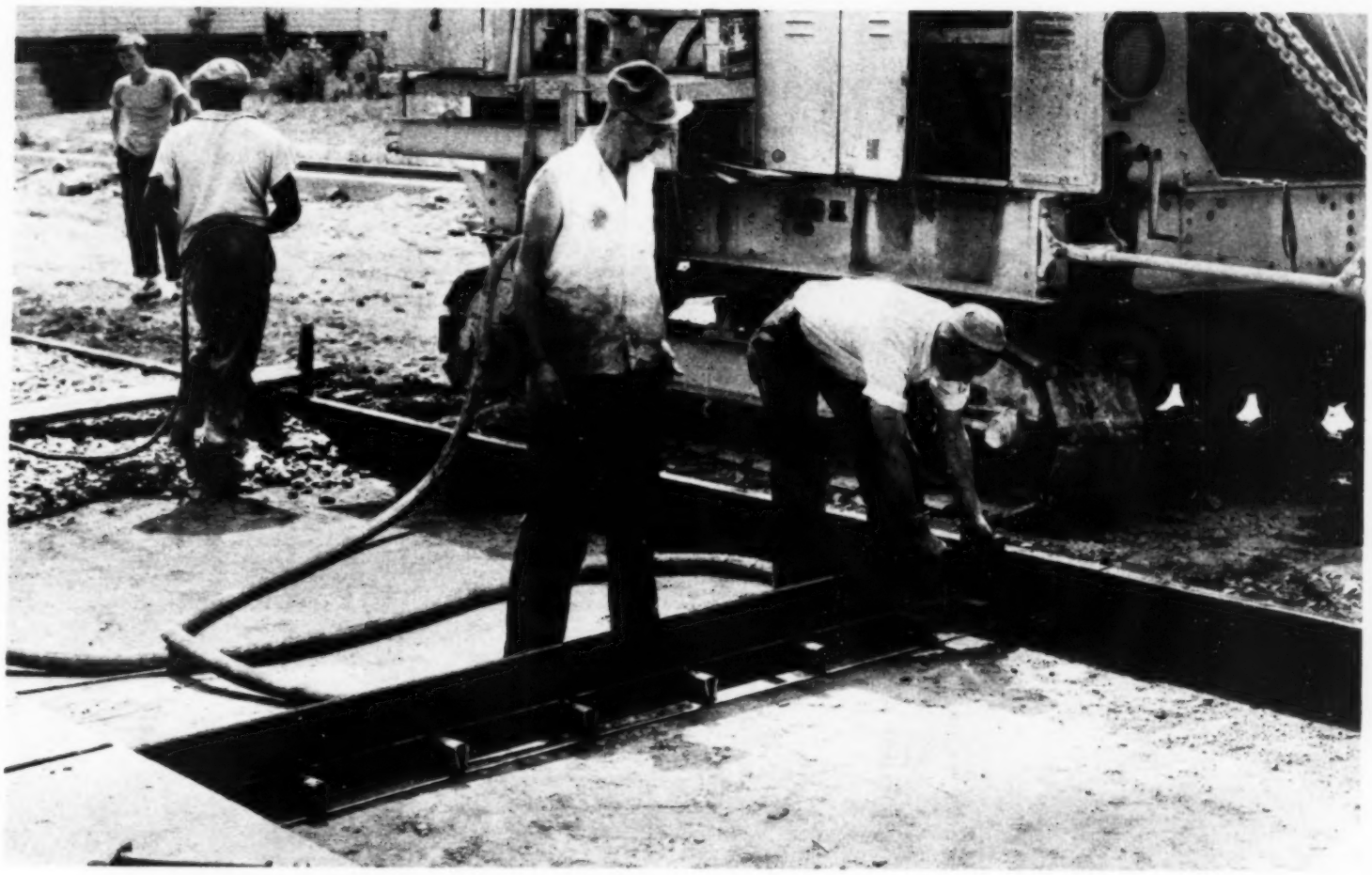
Occupational disease includes a list of more than thirty diseases which may emanate out of the employment. From their very nature it is frequently difficult to trace definitely the cause of the injury to the work itself, and for that reason it is only recently that state legislatures have been willing to extend recovery to include these cases. Probably hernia and silicosis are the most dangerous forms in road building, speaking generally. Some of the rates are very low, as on the production line of a modern automotive plant, while in quarry work and particularly in house wrecking, it may run into substantial percentages of the cost of the payroll. The estimator on a road contract should carefully study such phases of his proposal.

The estimator, as well as the general superintendent of construction, should keep in mind the problem of extensions of jurisdiction of the state workmen's compensation act. A resident of Brooklyn, New York, is working in New Jersey for a New York concern, or a resident of New York is working in Canada for a New York concern, or a resident of Pennsylvania is working in New York. These are practical cases which a contractor may find very costly, if his particular case is of such a nature as to remove his insurance coverage, and thereby leave him to carry the burden personally. It can probably be stated in a general way that a particular state is interested in its citizens to the extent that it expects workmen's compensation obligations to cover those residents who temporarily leave the state in the course of their home employment as well as those who remain exclusively in their home state. The wording of the statutes is often somewhat ambiguous in this matter and needs court interpretation to clarify practical applications of the law. Pennsylvania, for instance, provides that an employee who is temporarily outside of the state, not to exceed ninety days in any one trip, shall continue to be under the jurisdiction of the Pennsylvania statute, and a New York court has held that a well driller who was in New York state for ten days in connection with his regular Pennsylvania employment, and was thereby injured in New York state, was under the Pennsylvania law and refused recovery under the New York law.

A corollary of this case is found where a highway contractor in northern New York state had a workman in his sand pit in Canada, the workman having been employed in this pit for nearly two consecutive years. The court admitted that the

(Continued on page 112)

Unload 'em... place 'em
GET ON WITH THE JOB



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Bethlehem Road Joints come to you ready for instant placing, with dowels, caps, and chairs all assembled into one easily-handled unit. All you do is slip on the pre-cut fiber filler, set the assembly in place, and anchor with pins driven through the dowels. There's no time wasted locating, fitting and adjusting many parts together to form the unit.

Bethlehem Road Joints are made to hold their position, too. All dowels are shop-welded to steel spacing bars, parallel and carefully spaced. A third bar, welded to the tops of the dowels, stabilizes each unit and keeps the dowel firmly and accurately in place.

These dowels rest on the sub-grade with the base bars and form a solid support that resists displacement in any direction. Operators can drive finishing machinery over joints without displacing or disturbing them in any way.

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meet all needs

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(Continued from page 110)

New York law would govern employees who left the state of New York temporarily, but recognized a distinction in the case of this workman in the sand pit to the extent that the work in the Canadian jurisdiction was not a mere temporary excursion out of the New York territory and, therefore, did not grant recovery under the New York statutes. It is quite conceivable, under such circumstances, that a contractor might find himself without insurance coverage for the risk of his workmen employed beyond the state's borders.

No General Rule for Jurisdiction

Each legal controversy presents facts which must be analyzed on the basis of their own merit and it is extremely difficult to set up any general rule as to the jurisdiction of workmen's compensation acts. For instance, it might be noted that a Wisconsin resident, who had a regular job in Iowa and was temporarily sent into Wisconsin on a construction job for a few days, was held to be within the Wisconsin jurisdiction. On the face of it, this case might seem to be at variance with that Pennsylvania well driller who came into New York state for a ten-day job and was held under the Pennsylvania statute. One distinction can be drawn, however, between the two cases in that in the earlier case the employee was a resident of Pennsylvania where he did most of his work, while in the latter case he was a resident of Wisconsin and was only temporarily out of the state of Iowa to do work in Wisconsin. Road contractors who are inclined to send supervisory employees and technicians for temporary work into adjoining states might well study the legal significance of injuries during such employment.

Patents

In certain types of industrial and construction work a party may subject himself to severe penalties for the infringement of existing patent rights. These situations often arise due to the infringer merely "taking a chance." However, an examination of several consecutive years of litigation in this field failed to disclose any recent cases involving patent infringements by road contractors. Earlier cases occasionally arose, but they were primarily in the field of bitulithic surfacing, or patented equipment and methods of construction. In spite of the minimum risk involved by road builders in the performance of their normal contracts, it is well to appreciate that there are always possibilities in this field and to be alert to recognize their potential costs. The unlawful use of patent infringing equipment may involve heavy damages from unpaid royalties or licenses.

"PITFALLS IN BIDDING" will be continued in an early issue of *Construction Methods*.

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NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

GLASS FIBER INSULATION—**Owens-Corning Fiberglas Corp.**, Toledo, Ohio. (20 pp., illustrated). Explains how Fiberglas thermal insulating and sound absorbing materials for industrial buildings may be used to create "controlled conditions" for insuring maximum production at low cost. Facts are given about fuel savings for heating by use of proper insulation of structures. Information on thermal properties of walls and roofs of brick, concrete, metal and wood is tabulated. Booklet deals also with sound absorption and noise reduction through use of thermal-acoustical materials, including insulating wool, mats, sheets, blankets and boards. How insulation prevents condensation is explained. Examples of both interior and exterior applications are illustrated.

★ ★ ★

COLD WEATHER CONCRETING — **Littleford Bros.**, 457 E. Pearl St., Cincinnati, Ohio. (4 pp., illustrated). Three units for speeding up cold weather construction are described and illustrated: (1) Concrete heaters for concrete pouring in freezing weather made to fit tilting and non-tilting pavers as well as all sizes of mixers from 3½S to 21S. (2) "Booster" water heater which produces hot water at rate of 800 gal. per hr. at 100-deg. temperature rise. (3) Non-jacketed coke or wood burning water heaters for construction jobs which do not need large volume of hot water. Produces 375 gal. of water per hour at 100-deg. temperature rise. Attached to bulletin is Concrete Temperature Table which gives in tabulated form all data necessary for concrete mixing in cold weather, together with suggestions for getting best results from these operations.

★ ★ ★

HIGH SPEED EARTHMOVING — **LaPlant-Choate Manufacturing Co., Inc.**, Cedar Rapids, Iowa. (16 pp., illustrated). Describes "Carrimor" scraper unit of combination tractor-scraper outfit which is hard at work on defense projects — highways, airports, shell-loading plants, ordnance and supply depots and industrial plant expansion projects. Tells history and development of scraper and describes design features of bowl, hydraulic system, wheels and scraper which is same machine with front wheel brakes. Included also is section on TW-10 "Carrimor" assembly for use with track-type Caterpillar tractor.

★ ★ ★

VERTICAL PUMPS — **Pomona Pump Co.**, 206 East Commercial St., Pomona, Calif. (23 pp., illustrated.) Practical information concerning vertical pump adaptation to wide range of duties under varying operating conditions. Illustrated case histories of typical applications, including drawings of recommended layouts. Types include general purpose, deep well turbine, and mine dewatering pumps. Advantages claimed include compactness, elimination of priming, low starting torque and variable capacity adjustability. Semi-open impellers, operating in conically seated bowls, are raised or lowered by means of an adjusting nut at top of pump shaft to effect any predetermined discharge within variable range of pump.

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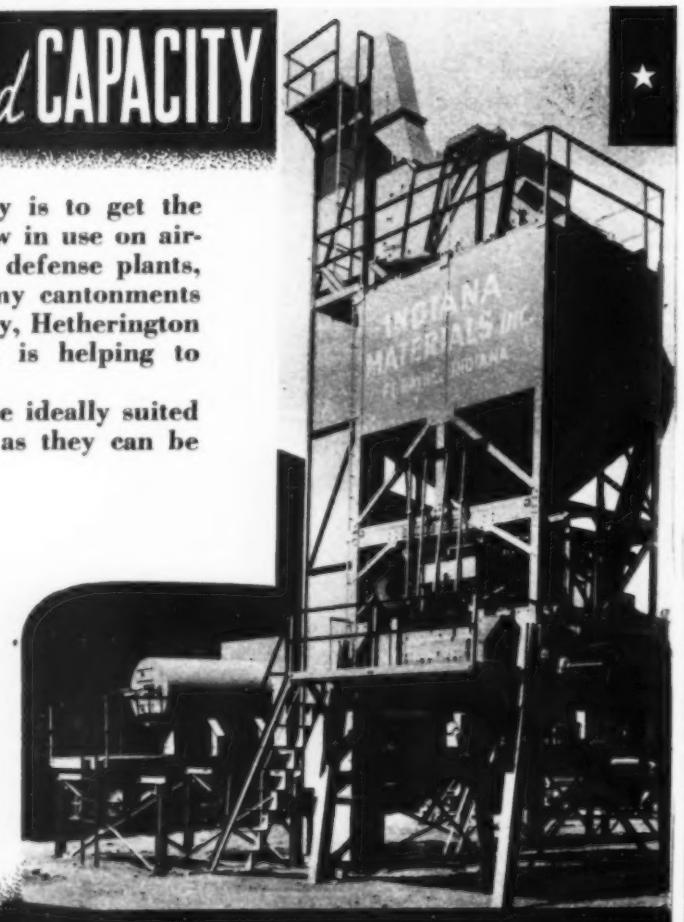

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WIRE ROPE—**Broderick & Bascom Rope Co.,** St. Louis, Mo. (32 pp., illustrated). Under title of "National Defense and Yellow Strand Wire Rope" booklet presents informative story, profusely illustrated with photographs, of wire rope's part in nation's war effort. After recounting uses of wire rope in essential industries such as construction, steel transportation, power and fuel, and munitions manufacture, text discusses priorities and deliveries and tells how users can help themselves and their country by proper selection, planned purchasing, correct application and careful maintenance of wire rope to conserve available supply.

★ ★ ★

TAR PAVING MANUAL—**The Barrett Co., Inc.,** 40 Rector St., New York, N. Y. (64 pp., illustrated.) Covers all of ordinary uses of Tarvia and Tarvialithic paving materials for both construction and maintenance. Under general subject of construction with Tarvia are included sections on gravel mulch, sand mix, re-tread, traveling plant mixes, penetration macadam, plant-mixed bituminous concrete and base stabilization. Section on maintenance covers patching, leveling courses to remove irregularities in existing road surfaces, surface treatments for various types of road, including gravel, macadam, bituminous, cement concrete, brick, top soil, sand clay and lime rock. Other sections are devoted to widening existing roads and curing slippery pavements. Tabulations cover Tarvia grades and uses and aggregate grades and uses. Booklet is attractively illustrated with photographs showing applications of method and equipment.

★ ★ ★

SOIL STABILIZATION EQUIPMENT—**Allis-Chalmers Mf'g. Co.,** Milwaukee, Wis. (28 pp., illustrated). Covers wide range of equipment and tools for soil-cement stabilized type of construction for highways and airports, including track-laying and wheel tractors, graders, plows, pulverizing and mixing disks, spike-tooth and spring-tooth harrows, subgraders, coil-shank mixers, water distributors, rollers and adjustable-shank chisels. There are also tractor-drawn tools for scarifying and subgrade preparation. For applying water an engine-powered sprinkler is equipped with a 1,000-1,500-gal. tank and a 350-gpm. pump. For all equipment complete mechanical specifications are provided.

★ ★ ★

EARLY STRENGTH CONCRETE—**Calcium Chloride Association,** 4145 Penobscot Building, Detroit, Mich. Bulletin No. 28 (64 pp., illustrated) tells how to obtain early strength and greater workability in concrete at temperatures below or above freezing through use of calcium chloride admixture. Book provides research data and reproduces excerpts of papers on concrete and concreting operations. Illustrations include more than 60 photographs, charts, graphs and tables.

★ ★ ★

REINFORCED CONCRETE—**Portland Cement Association,** 33 West Grand Ave., Chicago, Ill. (20 pp., illustrated). Second issue of Modern Developments in Reinforced Concrete discusses design of circular domes, design of water-jacketed concrete tanks for gasoline storage, and improved methods of detailing and setting steel reinforcement. Data on design of domes include formulas, numerical examples and derivations for spherical, conoidal and elliptical domes, with table for use in designing elliptical domes.

★ ★ ★

BITUMINOUS PAVING—**Kotal Co.,** 52 Vanderbilt Ave., New York, N. Y. (12 pp., illustrated). Booklet describes simple Kotal process of waterproofing aggregates to prevent stripping and increase effectiveness of bitumen in hot mixes, cold mixes and stockpiled mixes. Advantages of waterproofed aggregates also are indicated for patch mixing, road mixing, surface treatment and penetration work.

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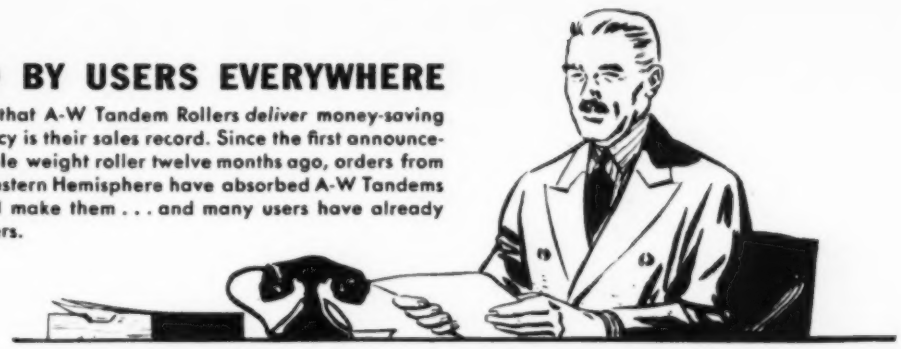

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WIRE ROPE — **MacWhyte Co.,** Kenosha, Wis. (4 pp., illustrated). Ropeology, a periodical which appeared for first time in February, 1942, reports experiences of wire rope users and gives practical information on wire rope applications in many classes of service. First issue stresses ways to conserve wire rope and answers questions frequently asked by users.

★ ★ ★

WATERPROOFING MATERIALS—**Primoid Products Corp.,** 103 Park Ave., New York City. (4 pp., illustrated). Bulletin describes various rubber-base compounds designed to stop leaks or seepage through brick, concrete, stucco or other types of masonry. When applied to metal, these Primoid products are said to prevent corrosion or rusting since they are resistant to oils, alcohol, gasoline, brine, acids and other chemicals. Claimed to be easy to apply, to provide durable, protective, permanent coating that will not peel, chip or crack and to be unaffected by heat or cold.

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TIRES FOR CONSTRUCTION INDUSTRY—**The B. F. Goodrich Co., Akron, Ohio.** (12 pp. illustrated, two-color). Describes wide variety of special tires company's engineers have "tailored" to fit requirements of construction, such as earth service, rock service, super-traction, trailer service, tractor-grader, wheelbarrow, truck-bus and commercial. Chart lists various tires, type of service for which they are fitted, what machines they may be used on and typical applications. One page is devoted to instructions on care and maintenance of tires stressing such points as danger of overloading, necessity of proper inflation, value of frequent inspection, maintenance of good haul roads, and extension of service through tread renewal.

★ ★ ★

IMPACT BREAKER—**Iowa Manufacturing Co.,** Cedar Rapids, Ia. (8 pp., illustrated.) Bulletin K-2 describes and illustrates Kubit impact breaker. Product, machine and tests of product are discussed. Construction features are illustrated and operating advantages are defined. Typical installations are shown. Dimensions and specifications of four sizes of "Kubit" breakers are included in bulletin.

★ ★ ★

SHOVEL-DRAGLINE-CRANE — **Link-Belt Speeder Corp.,** 301 W. Pershing Road, Chicago, Ill. (8 pp., illustrated). Describes and illustrates features of Link-Belt Speeder LS-60 heavy-duty ½-yd. crawler shovel, dragline and crane, particularly simplicity, reserve power, ease of handling and all-welded construction. Illustrations show machine at work and how it is built. Working ranges, lifting capacities, clearance dimensions and other pertinent data are given for shovel, dragline, crane, clamshell and trench hoe operation.

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FLUORESCENT LIGHTING FOR INDUSTRY—**Westinghouse Lamp Division, Westinghouse Electric & Mfg. Co.,** Bloomfield, N. J. (35 p. 5½x8½-in. booklet). Prepared for non-technical readers, this booklet answers popular questions in regard to cost, efficiency, advantages and maintenance of fluorescent lighting in industrial plants. Following subjects are covered: (1) Fluorescent lamps and accessories; (2) fluorescent lamp equipment; (3) design of fluorescent installations; (4) cost of fluorescent lighting installations; (5) questions and answers on fluorescent lamps, accessories and equipment.

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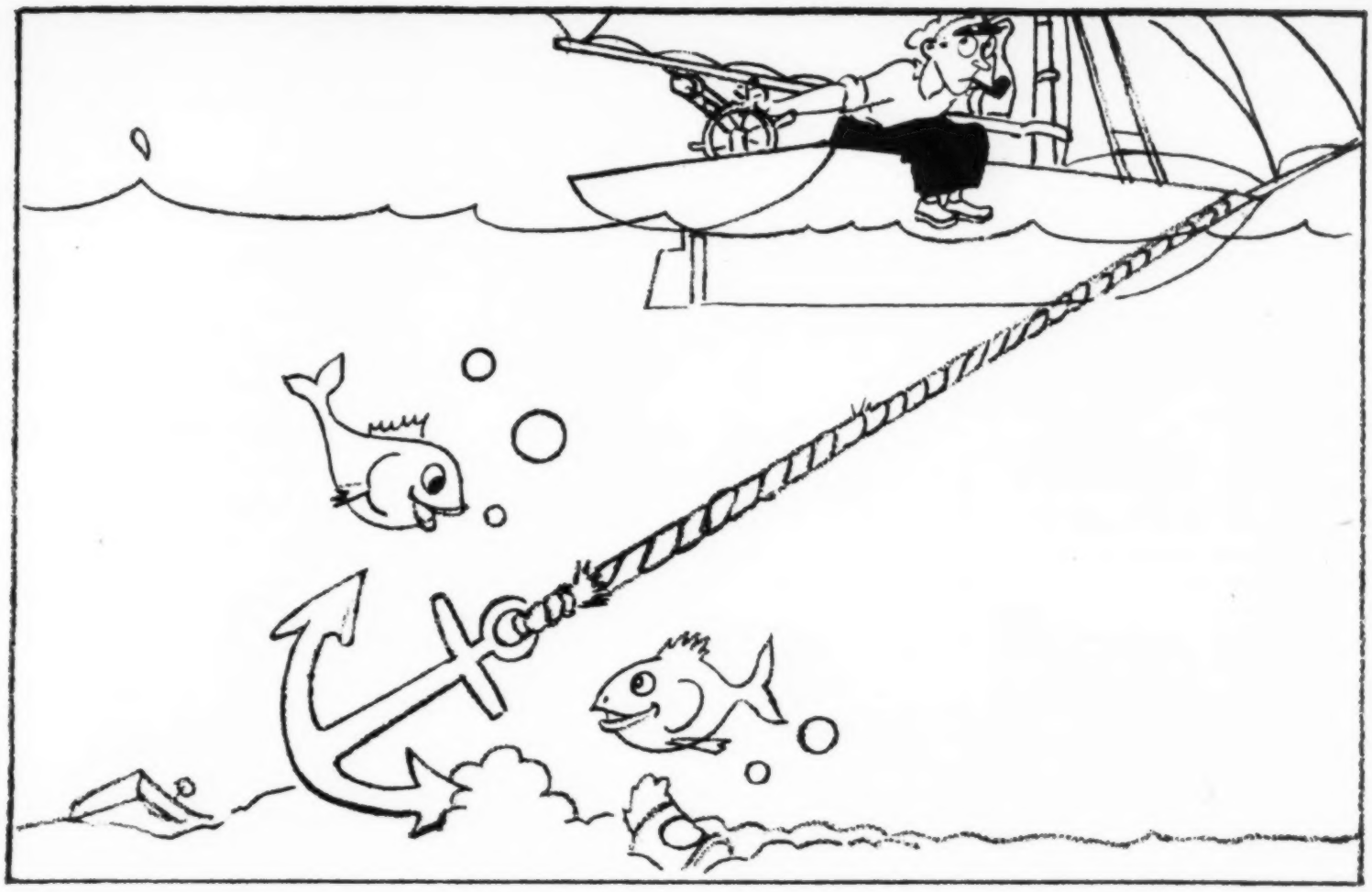
PORTABLE FORGES — **Hauck Manufacturing Co.,** 124-136 Tenth St., Brooklyn, N. Y. (4 pp., illustrated). Shows complete line of units for rivet heating, blacksmithing, coppersmithing and brazing which may be had either for oil or gas burning. Specifications for each type.



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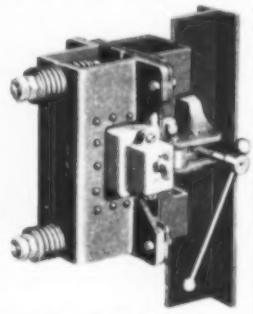

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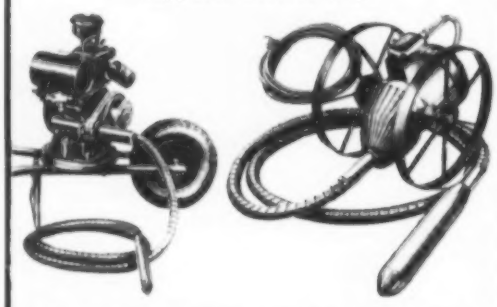

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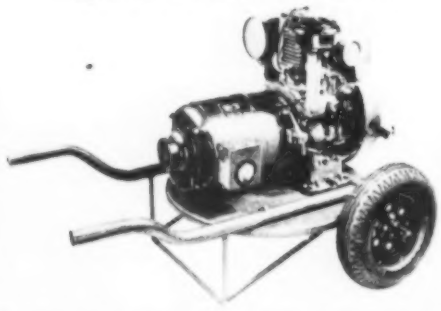

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VIBRATION CONTROL—**The Korfund Co., Inc.,** Long Island City, N. Y. (8 pp., illustrated). Prominent installations of Type S series of steel spring vibro-isolators are pictured. Wide range of marine and stationary applications are shown covering diesel engines and general industrial machinery. Chart concerning rated capacities of this series supplies preliminary information for those interested.

★ ★ ★

HIGH SPEED HEAVY-LIFTING CRANE—**R. G. LeTourneau, Inc.,** Peoria, Ill. (4-p. booklet) Describes and illustrates Tournacrane for construction and industrial use. Shows numerous applications around factory yards, industrial plants, building construction and earth-moving. Complete information on lifting capacity and speed.

★ ★ ★

CONTOUR SAWING MACHINE ATTACHMENTS—**Continental Machines, Inc.,** 1301 Washington Ave., S., Minneapolis, Minn. (6-p. folder). Contains descriptions and illustrations of twenty-one basic attachments designed to obtain full advantage from increased speed and cutting performance of Doall sawing machines. Some attachments listed: (1) Magnifying attachment enlarges work twofold and is adjustable to sawing, filing or polishing operation; (2) all-purpose mitering attachment which takes full advantage of automatic or hydraulic power feeds; (3) disk-cutting attachment assuring sawing, filing or polishing of true circles either internal or external of any diameter from 2½ to 30 in.; (4) saw lubricator assuring longer saw life and straighter cutting with finer finish; (5) electric etching pencil operated from built-in welding transformer assures permanent identification of parts machined.

★ ★ ★

STEEL FORMS—**Blaw-Knox Co.,** Farmers Bank Building, Pittsburgh, Pa. (60 pp., illustrated.) This new catalog (No. 1836) on steel forms for concrete pouring is profusely illustrated with construction photographs of many of big-name concreting projects now under way or recently completed. Included in descriptions are forms for circular, elliptical, horseshoe-shaped and box-shaped conduits; vehicular tunnels; walls; piers; dams; caissons; and bridge centering. New Blaw-Knox latch type hand handled forms are described and illustrated.

★ ★ ★

MOBILE TRUCK CRANES—**The Osgood Co.,** Marion, Ohio. (12 pp., illustrated). Devoted to description and picturization of Mobilcrane which differs from orthodox truck crane because it is powered by one engine, and operator from his position at levers in upper body controls all motions of crane including traveling. Various uses of Mobilcrane are shown, as well as features of mechanism which manufacturer wishes to emphasize.

★ ★ ★

DIESEL ELECTRIC SETS—**Caterpillar Tractor Co.,** Peoria, Ill. (20 pp., illustrated) Booklet gives specifications, applications, fuel consumption charts and advantages of eight diesel-powered self-regulating generators rated 13 to 90 kw.

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POWER GRADER—**The Austin-Western Road Machinery Co.,** Aurora, Ill. (8 pp., illustrated). Describes and illustrates construction and maintenance operations on which 99-M Grader may be used, such as rough grading and heavy ditching, scarifying, snow plowing, terracing and drainage, mixing, loading, rolling and bulldozing. Lists and explains various advantages in design claimed to make power grader superior machine. Section devoted to pictures and descriptions of attachments. Brief specifications for model.

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Stocked for immediate shipment in 100 principal cities.

THE GORMAN-RUPP CO., MANSFIELD, OHIO

Timber Bridge

Conserves Steel for War Use

(Continued from page 55)

3/8-in. steel gusset plates, two outer and two inner.

Floor trusses have 8x12-in. chords, 6x8-in. verticals, and 2x12-in. diagonals in pairs. Lateral bracing is of the K type, with 3x8-in. timbers and steel gussets welded to the main gussets.

Stringers are 6x16-in., 15-ft. span, spaced 30 in. on centers. Toenailed to the 4x10-in. subflooring is 2x2-in. laminated gum surface flooring.

All timber was creosoted. In the piling, a 16-lb. full-cell treatment was employed and, for the other wood, an 8-lb. open-cell treatment.

In designing the bridge, Prof. du Plantier took advantage of the technical data and typical Teco designs offered to engineers by the Timber Engineering Co., Washington, D. C., and advisory services of the company's regional distributors, Maxwell & Hitchcock, of Atlanta.

★ ★ ★

Arc Welding

Saves 20 Percent of Steel For Plant Building

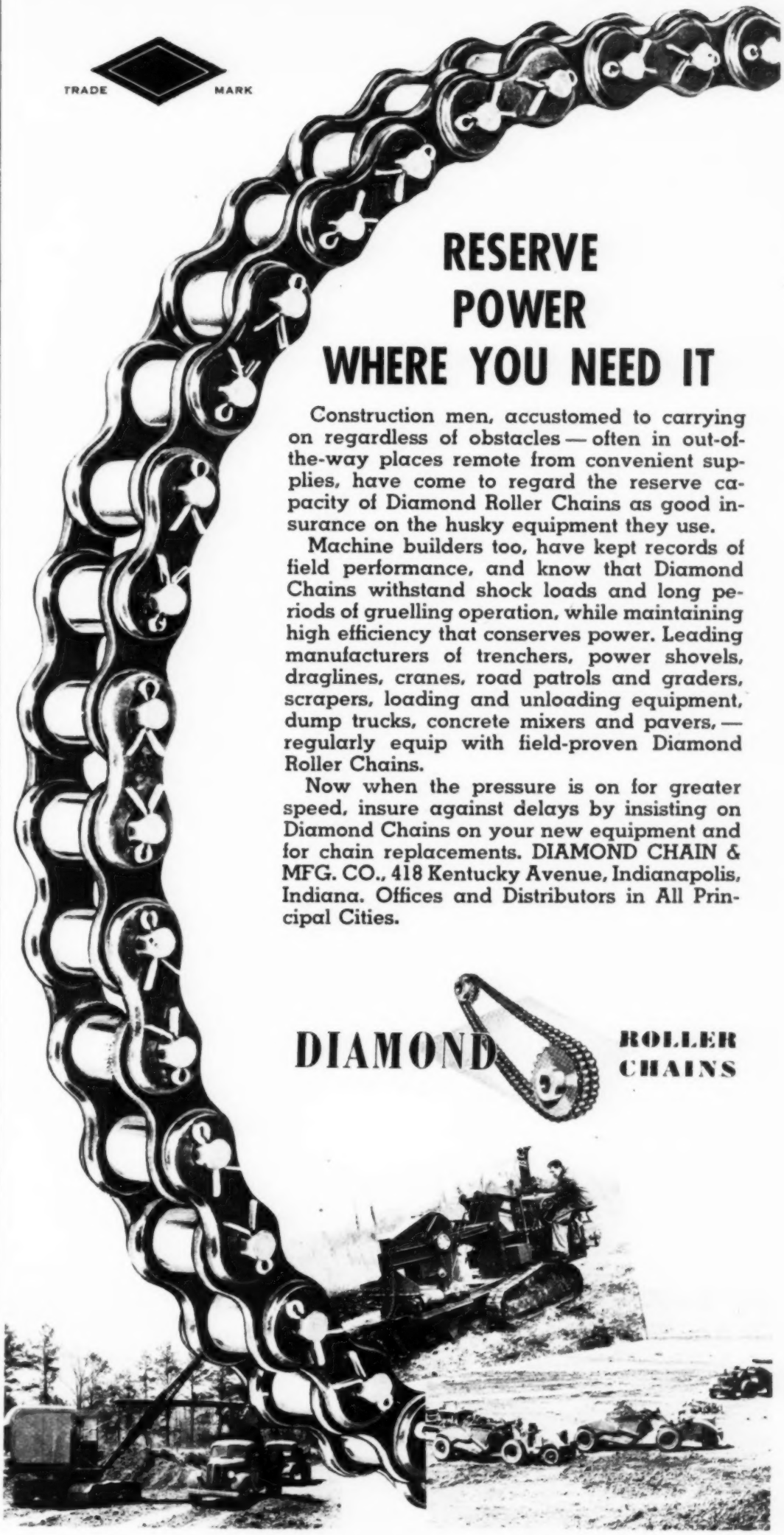
(Continued from page 59)

stead of the usual column construction, the columns of the buildings were made up of three I-beams arranged to form an H-section. The beams forming the flanges were smaller than those forming the central web. The beams were held together over their entire length by arc-welded seams of the intermittent type.

The other feature was the use of alternating-current arc welders for field assembly work. Although it is common practice to use a.-c. welding for shop fabrication, as was done in this case, d.-c. welders have ordinarily been used for field welding. On this job, however, General Electric a.-c. welders and shielded-arc electrode were employed.

Both field and shop fabrication was done by the Steel-weld Building Corp. of Los Angeles. The new factory building, 55 ft. wide and 250 ft. long, with sides of sheet steel, will house a cold-rolling mill for handling narrow strip work.

TRADE MARK



RESERVE POWER WHERE YOU NEED IT

Construction men, accustomed to carrying on regardless of obstacles — often in out-of-the-way places remote from convenient supplies, have come to regard the reserve capacity of Diamond Roller Chains as good insurance on the husky equipment they use.

Machine builders too, have kept records of field performance, and know that Diamond Chains withstand shock loads and long periods of gruelling operation, while maintaining high efficiency that conserves power. Leading manufacturers of trenchers, power shovels, draglines, cranes, road patrols and graders, scrapers, loading and unloading equipment, dump trucks, concrete mixers and pavers, — regularly equip with field-proven Diamond Roller Chains.

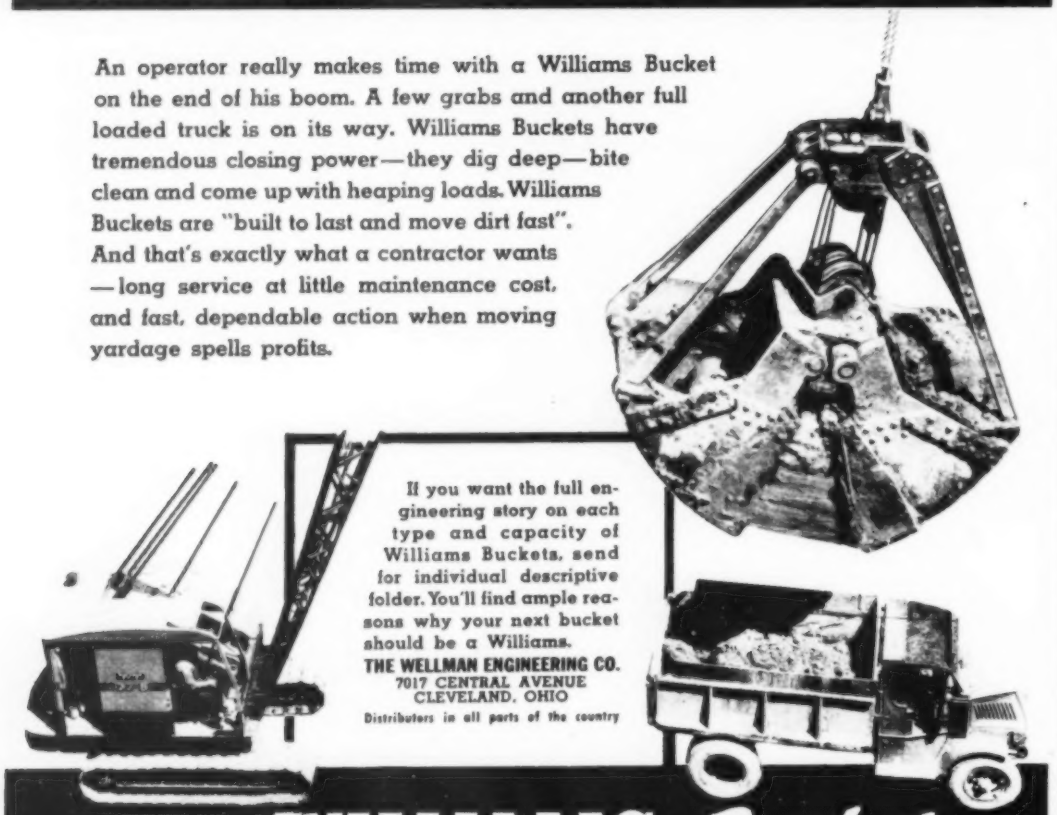
Now when the pressure is on for greater speed, insure against delays by insisting on Diamond Chains on your new equipment and for chain replacements. DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis, Indiana. Offices and Distributors in All Principal Cities.

DIAMOND ROLLER CHAINS

WELDED FOR GREATER STRENGTH AND SPEED

ROLLED STEEL CONSTRUCTION

An operator really makes time with a Williams Bucket on the end of his boom. A few grabs and another full loaded truck is on its way. Williams Buckets have tremendous closing power—they dig deep—bite clean and come up with heaping loads. Williams Buckets are "built to last and move dirt fast". And that's exactly what a contractor wants —long service at little maintenance cost, and fast, dependable action when moving yardage spells profits.



If you want the full engineering story on each type and capacity of Williams Buckets, send for individual descriptive folder. You'll find ample reasons why your next bucket should be a Williams.

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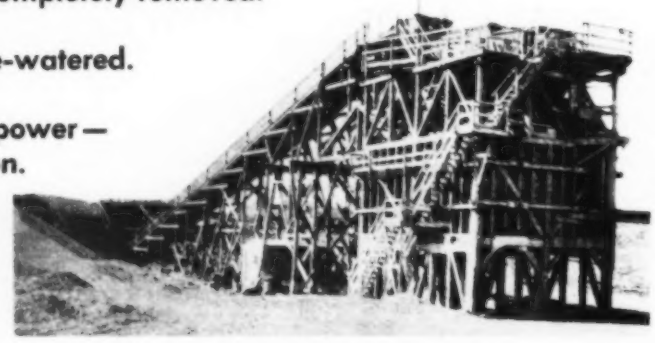
SAND and GRAVEL Washing and Handling Units

1. Foreign substances completely removed.
2. Sand thoroughly de-watered.
3. Saves head room, power—simplifies distribution.



The best results in cleaning sand and gravel are obtained through the use of Reliance System Revolving Screens and Paddle Type Boxes. Clay, loom and other foreign matter is completely removed and floated away. The sand is de-watered while being carried to the storage bin. The single sizing screen saves head room and power and simplifies distribution to storage. Send for Catalog No. 11.

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Douglas Dam

(Continued from page 39)

terials. Power production is scheduled to start in 1943.

The accompanying photographs illustrate operations preliminary to actual dam construction. To house the army of TVA workers, wood frame dormitories, originally erected at the site of the recently completed Cherokee Dam a few miles away, have been knocked down and reassembled at the Douglas Dam project. Logs cut from adjacent hillsides, are being used to build shelters to protect workers from flying debris during blasting operations at the damsite and will also be employed in cofferdam construction.

Construction of Douglas Dam will be under the general direction of Theodore B. Parker, chief engineer of the Tennessee Valley Authority.

★ ★ ★

Cash Value on Time Provides Incentive For Fast Highway Construction

(Continued from page 56)

entered in the bid under the time charge item.

A shorter contract for a little less than 5½ mi. of highway, calling for about 91,000 cu.yd. of excavation and 84,500 sq.yd. of reinforced-concrete pavement, was bid in by the Calumet Paving Co., Indianapolis, for some $278,000, including a time charge of $21,000 for 70 calendar days at $300 per day. Traffic began using this pavement throughout the length of the contract 70 days after receipt by the contractor of the notice to proceed. Accordingly, the state deducted from the final settlement 70x300 = $21,000 for the days bid under the time item.

Job Construction

Operations of the Gast Construction Co. are representative of the fast work accomplished on both contracts. Accompanying photographs, taken by Harry Alford, paving inspector, and supplied through the courtesy of David Gast, secretary of the company, illustrate work on the Gast contract.

Construction started in a season of adverse weather conditions. Heavy, spongy soil was moved by three Gar Wood and one LeTourneau scrapers, drawn by Allis-Chalmers tractors, and overhaul material was loaded into trucks by a Bucyrus-Erie shovel. An Allis-Chalmers tractor with a Baker bulldozer, a Caterpillar tractor-

(Continued on page 122)

78 WAYS

TO SPEED WORK— SAVE MONEY with a LORAIN MOTO-CRANE

ON NATIONAL DEFENSE

• Keep up-to-date on the newest and fastest equipment. This big, new, 32-page catalog is packed with time and money-saving ideas. It describes and illustrates 78 different jobs in 11 different industrial classifications. Facts and figures on every job are taken from actual field performance of many hundreds of Moto-Cranes already in service. Write for your copy today. It's free, of course.

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THE THEW SHOVEL COMPANY
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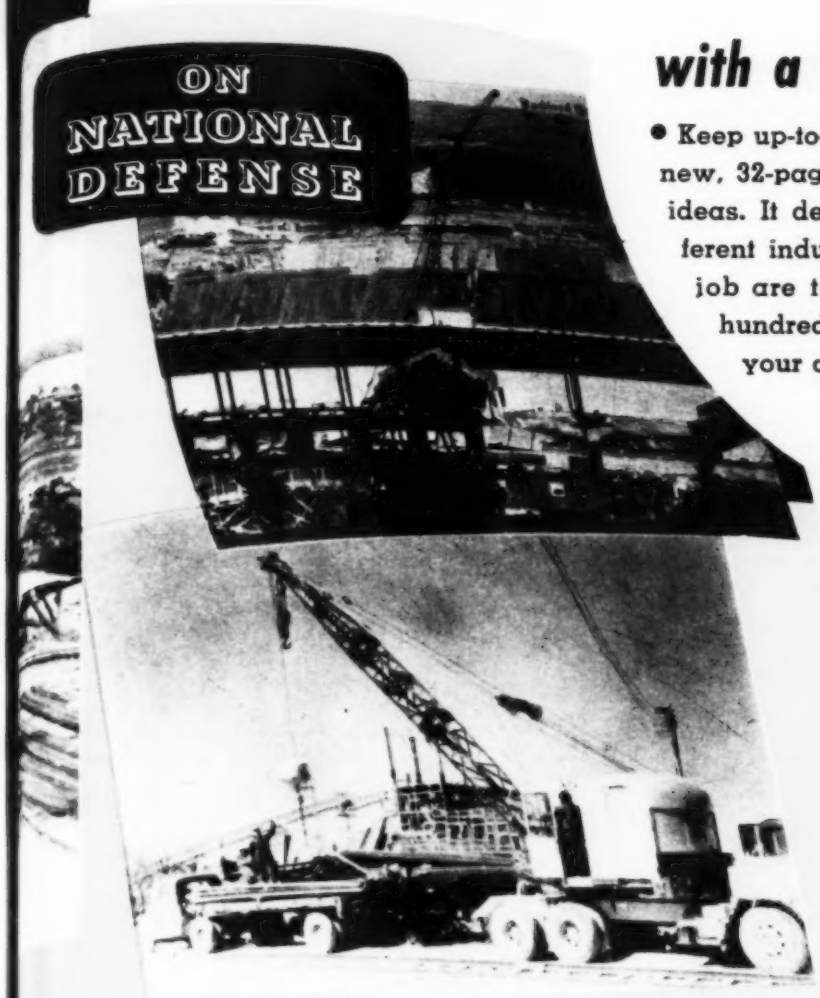

Indiana Ordnance Works, Ind. Combustion Engineering Corpn used a Moto-Crane to unload and erect boiler tubes and plates

St. Louis Ordnance Plant, Mo. New buildings in the Powder Storage Area shape up rapidly with concrete being swung into place by one of the 4 Moto-Cranes of Fruco Construction Co

THEW CENTER DRIVE

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MOTO-CRANE
UNLESS IT'S BUILT BY
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Ready! —for quick reference and ALL FACTS on what UNION makes for speedy plant construction — write or wire NOW for Catalog 184.

UNION IRON WORKS, INC.
Engineers and Manufacturers
Spofford & Lidgerwood Aves., Elizabeth, N. J.

(Continued from page 120)

drawn power grader, a Caterpillar motor patrol and a Huber flat steel roller worked on the grade. In an effort to compact the spongy soil in fills, the contractor operated sheepsfoot rollers.

As a result of a labor shortage in the area, significantly indicated by the employment of 30,000 construction workers on one defense plant next to the project, the contractor was able to operate only one shift. The employees in the defense plant had to travel through the job daily on their way to and from work, adding to the difficulties of construction. Proximity of the defense plant had its compensations, as the officials in charge provided free of cost a site for a batching plant, 24,000 cu.yd. of material from four pits for special borrow, and use of an office and garage building purchased from a private owner by the government.

Paving Operations

Subgrade was prepared by a Caterpillar 70-hp. diesel tractor, equipped with an angledozer, and by a Flynn self-propelled finegrader. The contractor used 4,000 ft. of Heltzel steel forms set in trenches excavated to line and grade by a Carr form-grader. Because of the spongy character of the soil, the paver had to operate outside the forms, contrary to the contractor's usual practice. Traveling on the unstable soil, the paver on numerous occasions crowded the forms out of line, causing short delays while the forms were realigned and set firmly to grade.

Paving equipment consisted of a Koehring 27E paver, a Jaeger-Lakewood finishing machine and a Koehring mechanical longitudinal float. The batchmeter on the paver was set for a 60-sec. minimum mixing period. To carry on paving operations without any interruption to the free flow of traffic through the job, it was necessary to make eight moves of the paving equipment after the work had begun.

Length of the working day was determined by what the force, working on a single shift, could stand. In general, the days ranged from 11 to 13½ hr. Coleman gas lights provided illumination after dark. The entire pavement, including all appurtenant features such as intersections, crossovers and connections to private drives, was completed in 36 paving days of 405½ hr. in which the paving crew placed 17,127 batches for an average of nearly 42½ batches per hr.

As a matter of accommodation to two large defense plants fronting on the highway, high-early-strength cement was used in front of plant entrances. At some entrances, gaps were left in the pavement, and adjacent slab was built with high-early-strength concrete. A number of these gaps later were filled with high-early-strength concrete to shorten maintenance of run-arounds.

At the batching plant, a Link-Belt crane with a 45-ft. boom handled three sizes of aggregate, large stone, medium stone and sand, out of stockpiles into Johnson bins with an Owen 1½-yd. clamshell bucket. All aggregates and bulk cement were truck-hauled to the batch plant, the cement being

(Continued on page 124)

Get help in passing license exams from this practical book

Here is a compact, handy manual by two well-known engineering writers, that meets all needs for quick review of, or reference to the most important elements of designing simple structures — of special value to those preparing for license or registration exams.

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THIS book covers the fundamental principles of structural theory and design in steel, timber, and concrete, together with a discussion of the essential fundamental principles of mechanics and properties of structural materials.

A concise explanation of the basic principles of structural mechanics has been included, to lead toward a deeper understanding of the subsequent design theories and methods.

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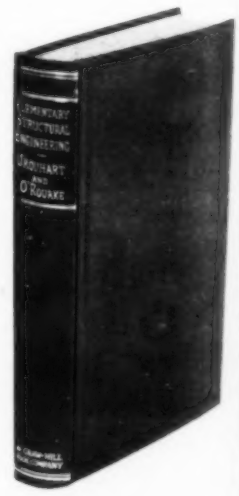
The remaining chapters explain and apply the theories involved in the design of the various structural elements, such as homogeneous beams of timber and steel, plate girders, reinforced concrete beams, tension and compression members in steel and timber trusses, columns of timber, steel, and reinforced concrete, members subjected to bending and axial stresses, and footings.

See what the book gives you:



—helpful groundwork in the principles of structural mechanics

—useful thumb-nail review of materials; characteristics, properties, fabrication, working stresses, etc.

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Preforming has added to the service of wire rope to all industry

PAGE 89

AND THEREBY CONSERVES STEEL FOR THE NATION

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Here in a few words the "MODERN WIRE ROPE DIGEST," America's No. 1 authority on wire rope, explains *why* Hazard LAY-SET lasts so much longer—gives so much better service—than ordinary non-preformed wire rope. Proper preforming gives LAY-SET amazing fatigue resistance; kink-resisting flexibility; makes it easier and faster to reeve; safer to handle. LAY-SET PREFORMED is the greater-dollar-value rope.

LAY-SET PREFORMED is backed by 96 years of rope-making experience and by a company that has clung so tenaciously to quality materials, manufacture and service that it has on its books many firms who have used Hazard ropes continuously for 40, 50 and 60 years. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

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You'll find Ransome Pavers helping to speed the construction of many Army Airports.

The latest improvement, the Hydraulically Controlled Boom Bucket, is making possible added production speed by eliminating split batches and by saving time and effort in many other ways. Write for Bulletin No. 195 which tells the complete story of this new feature.

RANSOME CONCRETE MACHINERY COMPANY
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Cut out the "Tug O' War"!

use Simplex Push and Pull Jacks

They save manpower and eliminate hazardous makeshifts. Speed straightening and tying of piling and bents, erection of falsework, razing of walls and stacks, tying of forms for pouring concrete, tying of structural members during assembly and tensioning of guy wires. They save time and provide maximum safety on boiler, tank and heavy equipment rigging jobs—one man and a No. 1542 can skid 15-tons. Used with pipe, cable or chain.

We're at war—no time for tug o' war on construction jobs—check into the advantages of using Simplex Push and Pull Jacks—send for Catalog 41.

No. 825, 8-tons capacity, 12" pull. Has hook ends.

No. 1040, 10-tons capacity, 19" pull. Has swivel hook-end.

No. 1524, 18" pull; No. 1528, 22" pull; No. 1536, 30" pull; all have 15-tons capacity. Nuts have spreading and clamping lugs and hooks.

Simplex Jacks
A better Jack for every job - many jobs for every Jack

TEMPLETON, KENLY & CO.
CHICAGO, ILL.
Better, Safer Construction Jacks Since 1899

(Continued from page 122)

delivered to a Butler bin by covered dump trucks from a cement mill 6 mi. away. Water was supplied through pipe line to the paver by a Gorman-Rupp triplex pump from a pond 1 mi. north of the right-of-way.

Direction

Specifications providing the desired incentive for speedy construction and meeting the approval of the state attorney general were written by W. J. Boatright, engineer of specifications for the Indiana Highway Commission. R. H. Harrell, project engineer for the Highway Commission, was in charge of the work on both contracts, which were built by the Gast Construction Co., Warsaw, Ind., and the Calumet Paving Co., Indianapolis. For the Gast Construction Co., of which A. R. Mills is general superintendent, Harry Weiss acted as superintendent of paving.

★ ★ ★

Asphalt Runways Serve San Francisco Airport

(Continued from page 54)

work was completed Nov. 7, at a contract cost of $115,889.

This project provides the airport with a network of runways including two more than a mile in length (one 5,500 ft. and the other 6,000 ft. long). Altogether the total area of hard-surfaced runways at this airport exceeds 2,500,000 sq. ft., in addition to warming-up aprons, taxi strips, etc.

In the work just finished, the 6- to 8-in. layer of rock used in the extension was thoroughly watered and rolled with a 10-ton roller until mud began to appear on the surface, indicating a dense consolidation. From this point on, the paving operations on old surface and new subgrade were similar.

New Wearing Surface

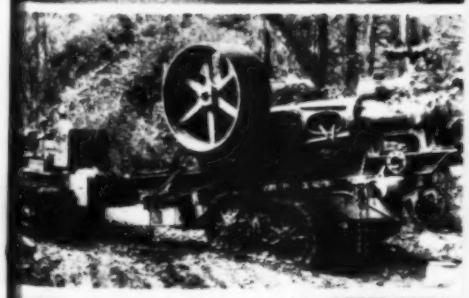
The materials used to build the new wearing surface of asphalt-penetration macadam, resulted in a surfacing that averages 3 in. in thickness. Where the total thickness of the required pavement exceeded 3 in., in resurfacing the existing runway, the new material was placed in "lifts" of about 2 in. each. For this first or base course, crushed rock of 2½- to 1¼-in. size was used. After this was spread carefully, hand spotting was done with the aid of long straightedges, each operated by

(Continued on page 126)

ON *Essential* FRONTS

Airports

A fleet of Athey Trailers pulled by "Caterpillar" Diesels works day and night on this Penn. landing field.



Iron Ore

This Athey MobiLoader loads ore on the Mesabi Iron range in Minnesota.

Oil

America's oil resources are vital for victory. An Athey Trailer provides sure-footing under a giant mud pump on its way to another well in this Louisiana field.

Sugar

A precious load of sugar leaves this Florida plantation on its way to the loading platform. The dependable transportation of Athey Tracks is essential to many industries.

Wood

Throughout the great lumber belt of the West and Northwest, logging production is increased with Athey Logging Cruiser Wheels.

ATHEY EQUIPMENT
Answers Wartime Needs

Sugar—iron—lumber—airports. Yesterday these were words of peacetime commerce. But today they've acquired a vivid meaning – a meaning interwoven with the very welfare and security of our nation.

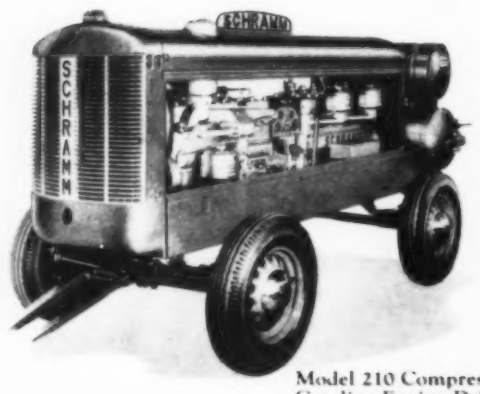
The mighty task of producing essential materials for victory has been undertaken with typical American determination. And as our forces fight on world wide fronts, so do men and machines work in the battle of production at home.

Athey Forged-Trak equipment has a wide diversity of important uses. Wherever there are tough hauling problems, wherever bad footing, big loads or adverse weather have to be licked, you'll find Athey Trailers. They're speeding output on vital war earthmoving jobs, hauling huge sugar trains from swampy plantations, transporting heavy oilfield equipment and tools, increasing the flow of iron ore, wheeling giant logs from the woods – providing sure-footed hauling units for many critical war-time operations.

Athey Trailers, Wagons and MobiLoaders are "in the fight" on many fronts all over the world. *When you experience delays in delivery, it is because the armed forces of Victory have first call on Athey production.* Athey Truss Wheel Co., 5631 W. 65th Street, Chicago, Illinois.

ATHEY

AIR for Victory



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Gasoline Engine Drive

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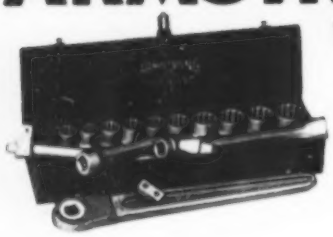
WRENCHES



- open end
- Box Socket
- Detachable Socket
- Construction Ratchets

There are ARMSTRONG Wrenches for your every need and each is the finest tool of its type.

ARMSTRONG Socket Wrenches extensions and handles are Chrome-Vanadium Steel. Ratchets are drop forged steel and the patented ARMSTRONG Drivelock locks sockets, driver, ratchets and handles to each other — will not knock or pry apart, sockets can not fall off.

ARMSTRONG Giant Construction Ratchets are *drop forged* steel. Nut sockets are *machined* from solid bar stock.

ARMSTRONG Drop Forged Structural and Construction Wrenches come in several types, in high carbon or Chrome-Vanadium steel. Large stub end box socket wrench takes long slip over handles.

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330 West 42nd St., New York, N. Y.

(Continued from page 124)

crews of two workers, who made every effort to prepare for a smooth surface. Next, an application of ¾ gal. per sq. yd. of SC-6 asphalt (200-300 penetration) was put on and then key rock ¾ to ⅜ in. in size was spread and rolled. This was followed by another application of SC-6 at the rate

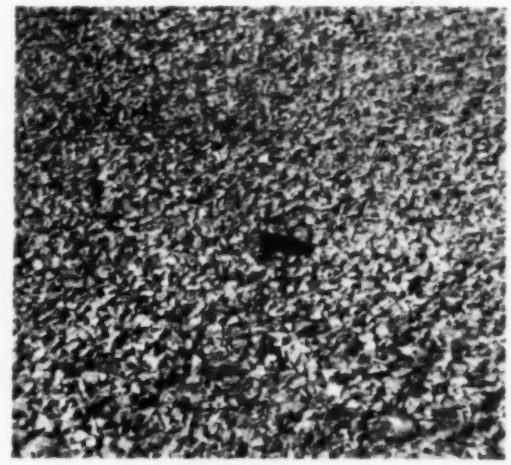


Fig. 8 . . . **SURFACE TEXTURE** has this appearance after key rock has been spread.

of about ⅜ to ½ gal. per sq. yd. Then came the rock chips (¼ in. to No. 8 mesh) followed by ⅜ gal. of emulsion per sq. yd., topped off with a sand coating. The final finish was made with ⅛ to 3/16 gal. per sq. yd. of oil emulsion and the surface left by this treatment was not dressed in any way. Thus the total of the several asphaltic applications summed up to about 1¾ gal. per sq. yd.

The work was done under the direction of the San Francisco Public Utilities Commission's engineering bureau, of which L. T. McAfee is chief engineer and manager; L. W. Stocker, senior civil engineer; J. C. Mohns, designing engineer and A. J. Wehner, construction engineer on this project.

★ ★ ★

Speedy Construction

Of Office Buildings For Washington War Workers

(Continued from page 58)

greater dollar value than did those of 1917-18.

Whereas it took from 80 to 100 days to construct the buildings for World War I, it takes from 38 to 60 days today. Most of the early buildings were of three stories and of frame and stucco construction. The present structures are all of two stories

(Continued on page 128)

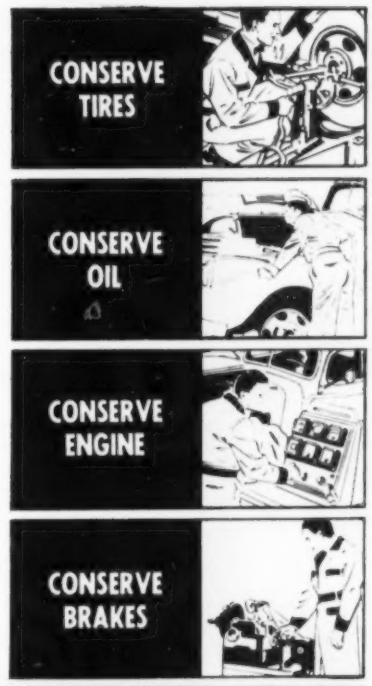
Transportation Is Vital to Victory!

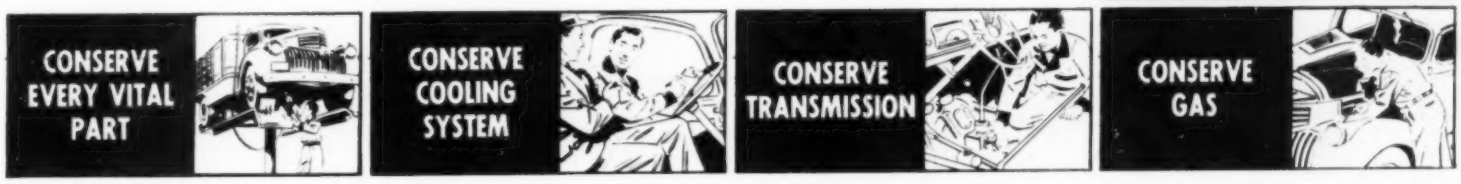
Keep Your Trucks Serving Dependably with CHEVROLET'S "Truck Conservation Plan"

Your Chevrolet dealer—specialist in "Truck Conservation"—will be glad to cooperate with you in every way to keep your trucks serving dependably and economically. . . . See him today for the *new and better kind of service* now available to all truck owners under the "Truck Conservation Plan" originated and recommended by Chevrolet.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT, MICHIGAN

ALWAYS SEE YOUR LOCAL CHEVROLET DEALER FOR SERVICE ON ANY CAR OR TRUCK





SPEED— *plus Economy with* VACUUM CONCRETE

DEFENSE PROJECT: 4 buildings, 300,000 sq. ft. of VACUUM-processed floor slab.

(1) Concrete has just been screeded.

(2) VACUUM suction mats remove excess water and consolidate concrete.

(3) Power float follows right behind suction mats on VACUUM-hardened concrete.

(4) Finishers start (and finish) troweling VACUUM CONCRETE hours earlier.

With VACUUM CONCRETE You:

Strip forms in 3 days and use fewer forms; —that's speed and economy.

Pour one or two hours longer every day, with less cement finisher overtime;—more speed and economy.

Get a hard, durable monolithic finish that equals topping placed later;—further speed and economy!

And only VACUUM CONCRETE offers these advantages as well:

More economical mix.

Doubled 3-day strength.

No dust coat or drier for monolithic finishes.

Wood block floors laid sooner.

Leading contractors have found it profitable to use VACUUM CONCRETE on more than 20,000,000 sq. ft. of Army, Navy and Public Works projects. It will pay you, too, to VACUUM process your concrete floor slabs.

Write for Leaflets

VACUUM CONCRETE for the CONTRACTOR
VACUUM CONCRETE STEP by STEP

VACUUM CONCRETE, Inc.
4210 Sansom Street Philadelphia, Pa.

(Continued from page 126)

and of wood frame construction with asbestos board exteriors. This, plus the fact that all lumber, exterior and interior wallboard, window and door frames, roofing and other materials are delivered to the jobs in standard sizes means that the new buildings will, when razed after the war, have a greater salvage value than did the older buildings.

Construction Force

The secret of the speed in construction is this virtual prefabrication, coupled with mass utilization of labor. At the start of a new temporary building the contractors have about 500 men ready to begin work. As the building takes shape this number is steadily increased until it reaches a peak of approximately 2,000 workers. Perfect coordination of various trade groups has resulted in an all-time record for the delivery of finished buildings of the size being built today.

The average square feet of usable space in the 13 buildings finished and the 10 soon to get under way is 112,000, or a total of more than 50 acres, compared with 41 acres in the buildings of the last war. If the 23 buildings were combined into one structure it would make a building of 47 stories covering an entire city block. If the building frontage of the 23 buildings were assembled, it would make a one-story building 11,000 ft. long, and 250 ft. deep.

The World War I buildings offered a total of 2,300,000 sq. ft. of office space while the present 23 buildings will offer nearly 2,600,000 sq. ft. and plans are being formulated by PBA for additional structures.

Planning Problems

The whole program of temporary structures presented problems not encountered 25 years ago. At that time, Washington's population was about one-third of today's figure. The Mall was still in the formative stage and there were practically no traffic difficulties. Today it is just the opposite. The population is nearly 1,000,000, the Mall has become a permanent thing of beauty and traffic problems are growing by leaps and bounds. All of these were considered by PBA in the present plans. After much study it was decided to decentralize the new buildings. They have been so placed as to improve traffic conditions rather than make them worse. Buildings have been located from Lincoln Memorial, on the west, to Anacostia on the east, and from the War College in southwest Washington, to H Street, Northwest.

Workers in various sections who will use these buildings can reach them without going through downtown Washington. In like manner, those living in the suburbs can reach the buildings located in the area from the Memorial to the Capitol direct without using the heavily traveled down town streets.

PBA and the contractors have planned that after the war the temporary buildings will not remain to become eyesores. They are so built that they can be dismantled in less time than it took for erection.

Concrete Vibrating, Concrete Surfacing, Sanding, Wire Brushing, Grinding, Sharpening Tools, Drilling, Circular Sawing, and Pumping.

● With only 2 gallons of gasoline, you can get a full day's work from this one-man portable power unit . . . save time, material and do more for Defense with fewer hands. The 1 H.P. air-cooled, variable speed gasoline engine supplies ample power for each job . . . is easy to start and runs by itself. This unit is easily carried anywhere on the job by one man. It is ruggedly constructed for field service under all conditions. Write for a FREE Demonstration and 1942 catalog.

MALL TOOL COMPANY
7757 South Chicago Ave., Chicago, Illinois
★ ★ *We make over 200 gasoline engine, air and electrically operated portable tools and attachments.*

•••ON ALL TUNNELING JOBS...

...MAKE IT

COMMERCIAL

LINER PLATES and SUPPORTS!

An example of the width of application of COMMERCIAL Plates and Supports as well as their safety, time and money saving characteristics, is demonstrated by these two small diameter tunnels. These underpasses under railroad tracks eliminated the digging of an open trench through the use of COMMERCIAL Plates . . . made the job less hazardous through COMMERCIALS' self-support . . . allowed "holing through" in the shortest possible time. You can use these kinds of savings . . . *and you can use COMMERCIAL on your next tunneling job.* Sizes for every tunnel — types for all kinds of ground. Write for literature — also prices, deliveries, etc.

The COMMERCIAL SHEARING & STAMPING CO.
YOUNGSTOWN, OHIO

Weldon Spring Ordnance Works

(Continued from page 53)

to 8-in. diameters. Distribution systems for process lines and other plant areas total 17 mi., including 14½ mi. of 16-, 12-, 10-, 8-, and 6-in. Transite, less than ½ mi. of 12- and 6-in. cast iron and more than 2 mi. of galvanized steel service connections in smaller sizes of 1¼, 1½, 2, 2½ and 3 in. A water system duplicating the features of the first unit has been installed for the second unit. One difference in the latter system is that all 30-in. lines are steel pipe with Dresser couplings.

All pipe is covered with a minimum of 4 ft. of earth. During construction of the first unit, excavation of trenches by seven trenching machines enabled pipe crews to lay as much as 12,000 lin.ft. of distribution lines in one day.

Treatment Plant

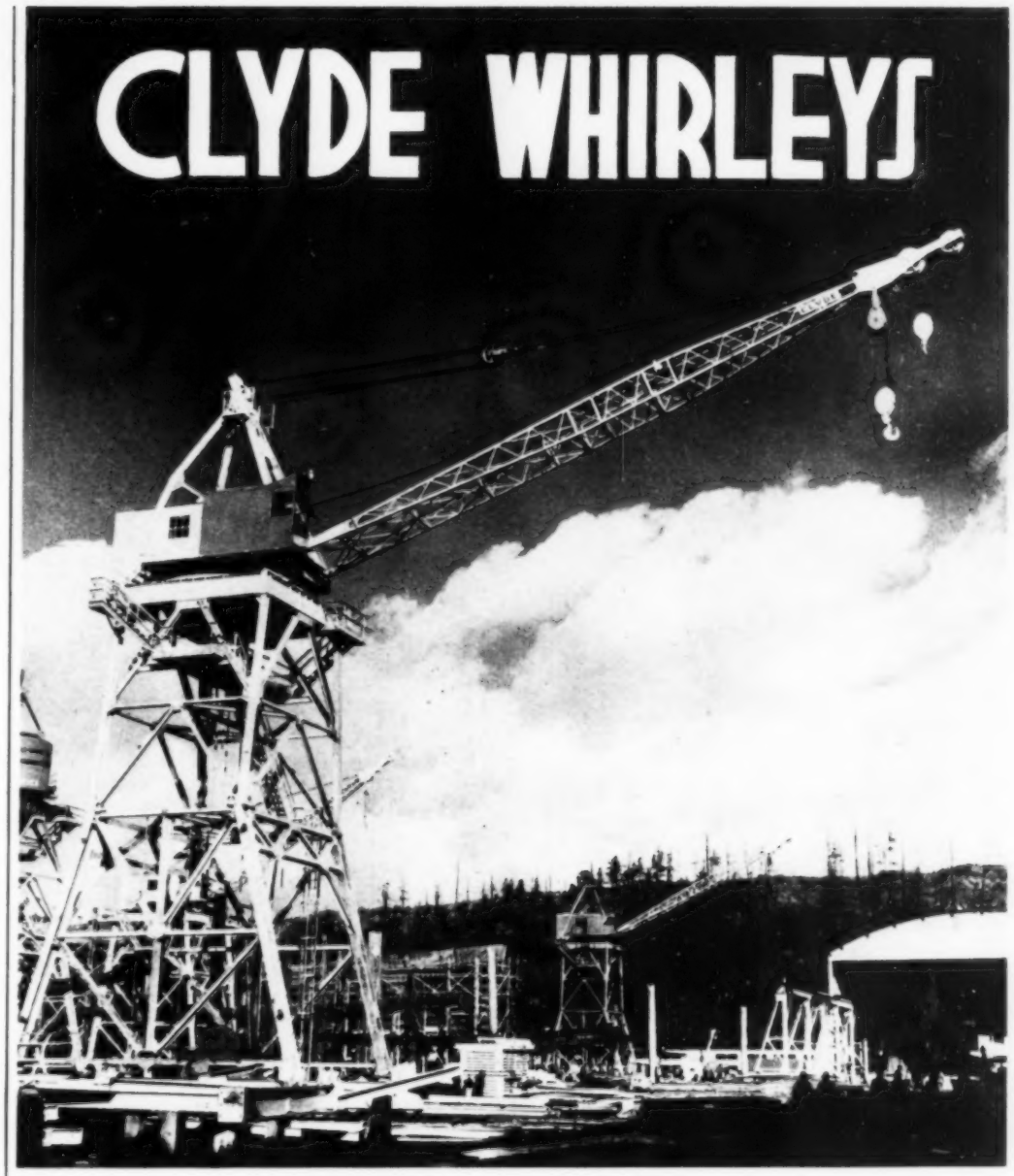
Water from the wells is delivered at the treatment plant to concrete aerator tanks 181 ft. long. Aeration in these tanks restores any deficiency in oxygen and oxidizes ferrous iron to ferric, causing the iron to drop out. From the aerators, the water flows by gravity to two circular concrete agitator tanks, 60 ft. in diameter by 18 ft. deep, where hydrated lime is added mechanically to soften the water. Softened water overflows into annular troughs at the tops of the agitator tanks and travels by gravity to the first of eight filters employing gravel and anthracite coal as the filter medium. After filtering, the water flows to a two-story reinforced-concrete building, 40x80 ft. in plan, where it is chlorinated and is held in clear wells for about 1 hr. The softened and sterilized water then is pumped to the reservoirs.

Reservoirs

Water is stored for distribution in circular prestressed concrete tanks of 2½-m.g. capacity. The first unit of the plant has several of these reservoirs, all buried underground. Each tank is 100 ft. in diameter by 42 ft. high and is covered with a dome roof. Poured-concrete walls and floors of the tanks were built by the Fraser-Brace Engineering Co., and the walls were prestressed by the Preload System Co., Long Island City, N. Y., which also constructed the dome roofs.

Walls of the tanks are 36 in. thick at the base, the thickness reducing by uniform batter on the inside to an 18-in. width of wall at the top. The Preload system of prestressing these tanks employed hoops of steel bars around the circular walls. From the base to a level 35 ft. above, the hoops consist of 1⅛-in. steel rods spaced at increasing intervals of 0.2 to 1.2 ft. From the 35-ft. to 40.6-ft. level, the hoops are ¾-in. rods spaced on 0.6- to 1.0-ft. centers. Beginning at the bottom, the rods were stressed individually to 40,000 lb. per sq.in. as indicated by extensometer readings. After the stresses in the rods had

(Continued on page 130)



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Seven standard sizes with lifting capacities up to 140,000 lbs. at a 35 foot boom radius and 22,000 lbs. at 150 feet. Powered by Diesel, electric, steam, gasoline or Diesel-electric.

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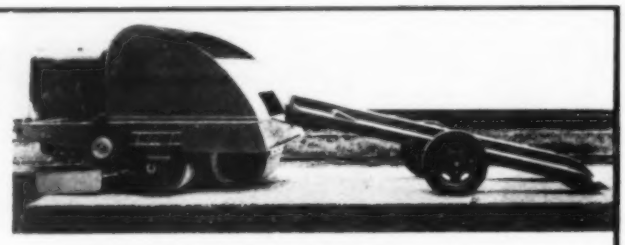
DULUTH, MINN.

HOISTS • WHIRLEYS • CARPULLERS • DERRICKS • DECK MACHINERY

SPREADEROLLER

Applies Wearing Course to Runways, Roads and Streets



Averages a Mile an Hour of Finished 10' Wide Strip

The Universal "Chip-Top" Spreaderoller not only spreads material on bituminous treated base and rolls it tight and smooth once over, in a single operation, but it deposits the seal coat in 3 layers—*which no truck type spreader or hand spreading can accomplish.*

The shaker screen on the Spreaderoller deposits coarse material first, medium size next and chips on top to fill the voids. That's the secret of the smooth, long lasting, high-visibility, water repellent surface you get—no coarse material on top to give that "washboard" effect or dislodge and scatter to the shoulders.

The thorough amalgamation that takes place makes it unnecessary to screen out excessive chips and dust and lower grades of cut-back can be used—saving in material as well as equipment and manpower.

Bulletin No. 800-A gives all the details!

UNIVERSAL CRUSHER CO.
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UNIVERSAL

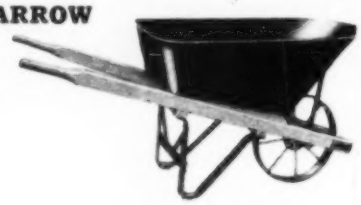
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

IN A HURRY? DEPEND ON JACKSON EQUIPMENT

Every Supply House carrying Jackson equipment knows what contractors are up against these days. Speedy delivery is now as important as correct design, high durability and price. The Jackson distributor has all these advantages — Get in touch with him today.

TYPE M11 CONTRACTORS BARROW

Preferred by many contractors because of their narrow, large capacity trays. Built to take rough treatment and long exposure. Available also with steel tubular frames and steel wheels. Standardized production assures lowest price consistent with high quality.



TYPE 88 CONCRETE CART

A perfectly balanced, easy to wheel vehicle with drop axle, roller bearings and pneumatic tires. Design and construction of bodies prevents opening at seams. Made oversize to give full six and one-half cubic feet wheeling capacity.

STEEL MORTAR MIXING BOXES

Formed from a single sheet of steel with corners lapped, riveted and reinforced with malleable iron sections. Bottom and sides are smooth inside and permit the material to be mixed and emptied with minimum effort. Made in three sizes.

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JACKSON
MANUFACTURING COMPANY
HARRISBURG, PENNA.

SUPERIOR PRODUCTS SINCE 1876 JACKMANCO

(Continued from page 129)

been adjusted to equalize them, the rods were covered with a 2-in. coating of Gunite.

Waste Disposal

Waste water from processing units is conveyed to disposal facilities through wood pipe of 4- and 6-in. diameters. Nearly 5 mi. of this pipe was required for the plant's first unit. Storm drains and sanitary sewers included in the original contract called for more than 5 mi. of 6- and 8-in. vitrified clay pipe. Seven sets of tanks were constructed to collect waste water from the processing lines. Four Imhoff tanks were provided for treatment of waste water, and one Imhoff tank and nine septic tanks for treatment of sanitary sewage.

WELDON SPRING ORDNANCE WORKS

Principal Earthmoving and Automotive Units

27 CRANES
- 3 Bucyrus-Erie (10B, 1035, 20-B)
- 1 Byers (83)
- 3 Koehring (604, 301, 701)
- 3 Lima (1201, 550, 602)
- 5 Lorain (three 40A, two MC-4)
- 1 Marion (362)
- 2 Michigan (TMCT-16, TLCT-16)
- 5 Northwest (25, 6, M-4, two 85)
- 1 Osgood (Victor)
- 3 P&H (255A, 203A, 455)

72 TRACTORS
- 24 Allis-Chalmers (ten HD-14, six HD-10, six L, IU, WF)
- 40 Caterpillar (twenty-seven D8, five D7, two D6, three D22, D4, D50, D88)
- 8 International (four TD-18, four TDR)

13 GRADERS
- 1 Adams (125)
- 5 Allis-Chalmers (110, 1B, three AB)
- 3 Austin-Western (99)
- 4 Caterpillar (12)

26 BULLDOZERS
- 7 Baker (256, 336, two 337, three RC-5)
- 3 Bucyrus-Erie (T-18)
- 7 LaPlant-Choate (B-6, B-7, three BN-71, two 319)
- 9 LeTourneau (7B, AK-8, two K-8, two K-8B, three XD-9)

29 SCRAPERS
- 4 Bucyrus-Erie (S-90)
- 11 Gar Wood (five 400, six T-20)
- 14 LeTourneau (K, J-8, three BU-12, four U-12, five F)

6 SHEEPSFOOT ROLLERS
- 2 Adams (20)
- 1 Four Bros. (2A)
- 3 LeTourneau (W-2A, two W-2)

3 RIPPERS—LeTourneau (H-3, two K-30)

137 TRUCKS

25	Chevrolet	1½-ton
16	Dodge	1½-ton
1	Dodge	1-ton
72	Ford	1½-ton
10	GMC	1½-ton
7	International	1½-ton
6	International	4-ton

195 PICKUP TRUCKS

116	Chevrolet	½-ton
39	Dodge	½-ton
26	Ford	½-ton
7	G.M.C.	½-ton
7	International	½-ton

38 STATION WAGONS
- 25 Ford eight-passenger
- 9 International eight-passenger
- 4 Plymouth eight-passenger

21 PASSENGER CARS
- 10 Chevrolet
- 8 Ford
- 3 Plymouth

PLENTY OF R-E-A-C-H -- and on the DOUBLE-QUICK!

MICHIGAN Mobile CRANES are the right "set-up" for today's vital construction projects because:

MICHIGAN'S stable low-slung frame provides wider working ranges.

Weight evenly distributed on ten large pneumatic tires permits low unit ground pressures.

Operators work faster — with greater precision and less fatigue through MICHIGAN'S Air Controls.

Ample power for heavy lifts supplied by heavy duty motors.

Only a couple of hours required for converting to any standard attachment — Shovel, Clam, Dragline, Trench Hoe.

Valuable time saved all-the-time by MICHIGAN'S "truck-mobility."

Find out why MICHIGAN Mobile CRANES will help you to meet today's "rush-construction" schedules — write for Bulletin CM-42.

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SHOVELS - CRANES - CLAMS DRAGLINES - TRENCH HOES

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800 to 50,000 WATTS

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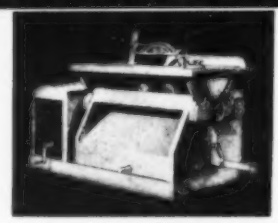
No. 33 PORTABLE SAW RIG



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PRACTICAL ARC WELDING MANUAL
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COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
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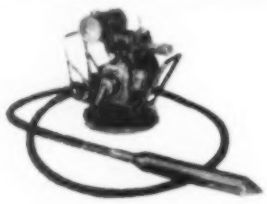
NEW ADVERTISEMENTS
received by April 23rd appear in the May issue, subject to space limitations.
Address copy to the Departmental Staff
CONSTRUCTION METHODS
330 West 42nd St., New York City



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Write for Circular on types, sizes and prices
White Mfg. Co.
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WET *Jobs?*
Dry Subgrades Guaranteed with
GRIFFIN WELLPOINT SYSTEMS
Whether you Buy or Rent!
BOTH Equipment and Dry Jobs are Guaranteed—Let us prove that GRIFFIN EQUIPMENT IS BETTER!
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881 EAST 141st ST. NEW YORK, N. Y.
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A Good Habit . . .
This "Where to Buy" Section supplements other advertising in this magazine . . .
It's a good habit to check this page — every issue.

SEARCHLIGHT SECTION
(Classified Advertising)
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10 Cents a Word. Minimum Charge $2.00.
Positions Wanted (full or part time salaried employment only), ½ the above rates payable in advance.
Box Numbers—Care of publication New York, Chicago or San Francisco offices count as 10 words.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisements.
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An Advertising inch is measured ⅞" vertically on one column, 4 columns—48 inches—to a page.

NEW ADVERTISEMENTS received by April 23rd will appear in the May issue, subject to limitations of space available.

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Immediate Delivery
Located New York City.
4 Wheel Trucks; Enclosed Vestibules
End Diaphragms.
IRON & STEEL PRODUCTS, INC.
37 years' experience
13458 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

POSITION WANTED
HAVE 30 YEARS EXPERIENCE supervising and building all phases of Federal, State and City paving, Bridges, Viaducts, Heavy and light Grading, Interceptor Sewers, Water Lines, Air Ports, Heavy Concrete Foundations and Flood Walls. Familiar with all modern equipment. Qualifications cover any project. Organizer and knows cost. Best of references. Available for immediate connection. PW 130, Construction Methods, 330 West 42nd St., New York, N. Y.

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Engineering and Mining Journal
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Factory Management & Maintenance
Food Industries
Power
Product Engineering
Textile World
Transit Journal

Sheetpile Driving

AT

NEVERSINK DAM

(Continued from page 67)

piles, alternate piles were cut to 30-ft. lengths, interlocked and then welded into full-length units. Handling holes 1½ in. in diameter were burned 20 ft. from the bottoms of the short pieces and 25 ft. from the tops of the 65-ft. full-length piles.

To facilitate the driving of two of the sheetpile units at the same time, two slotted rectangular pieces of ¾-in. sheet steel were welded to the body of the pile hammer, as illustrated, to serve as guide supports for the hammer. The work of moving the timber guide frame into position and setting up 22 piles ready for driving required from 8 to 12 hr., while the driving of a full frame of piling took from 1 to 2 hr. The hammer was operated by air at 105 lb. per sq.in. pressure.

★ ★ ★

Windowless Plant

Completed for

Army Bomber

Production

(Continued from page 65)

the world, comfortable in all weather.

Faced with the need for uninterrupted production of heavy bombers at the fastest possible rate, the Army Corps of Engineers and Air Corps set standards which would be sure to maintain working comfort and high production efficiency on their assembly lines right through the sultriest summer heat. The "ferroglas" construction introduced by Austin engineers to meet these requirements combines glass fiber, sheet steel products, special vaporproof paper and asphalt coatings in what are probably the most heavily insulated sidewalls and roofs ever designed for a factory. It also gives the plants exceptional sound control, since at least 75 percent of all factory noises will be absorbed in the walls and ceilings.

The plant is lighted entirely by two types of fluorescent lamps, and has white cement floors which reflect light upon the under side of the wings and fuselages to aid men working underneath the bombers which move down a long, unobstructed assembly line extending the entire length of the structure.

This modern, well designed equipment . . . manufactured by the T. L. Smith Company, Milwaukee, Wisconsin . . . is powered by Dependable Continental Red Seal Engines

No. 3½ Smith-Mobile with a capacity of 3½ yards as truck mixer and 4½ yards as agitator. Mounted on Ford cab-over-engine type truck and powered by a dependable Continental Red Seal Model PF186 enclosed type engine. Equipped with two-compartment water tank, turbine type water pump, feed chute and two-piece 9-foot swivel distributing chute.

Continental
Motors Corporation
MUSKEGON, MICHIGAN

The FOUNDATION UNIT

OF THE

Uni-Form System of Wall Form Construction

PROVIDES

A FOUNDATION WALL IN MONOLITHIC CONCRETE AT MASONRY WALL COST

We Supply the Steel Frame and Appurtenances

●

You Supply the Plywood and Studs

●

You Assemble It and Save Money By Using Your Labor

●

Build Your Forms Now for Next Year's Business

Features:

Steel Frames with Protected Plywood Edges Assure Longer Life — More Reuses — Faster Erection and Stripping — Plywood Nailing Surface. Straight Walls — Tight Forms — Smooth Surfaces.

●

The Uni-Form Tie — A Spreader Eliminating Wood Spreaders — A Lock — Assembles the Forms — Breaks Back from Wall Face.

●

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(Hazard Wire Rope Div.) 123
Ames Baldwin Wyoming Co. 102
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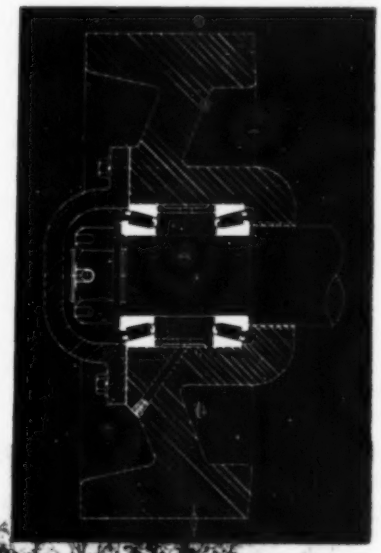
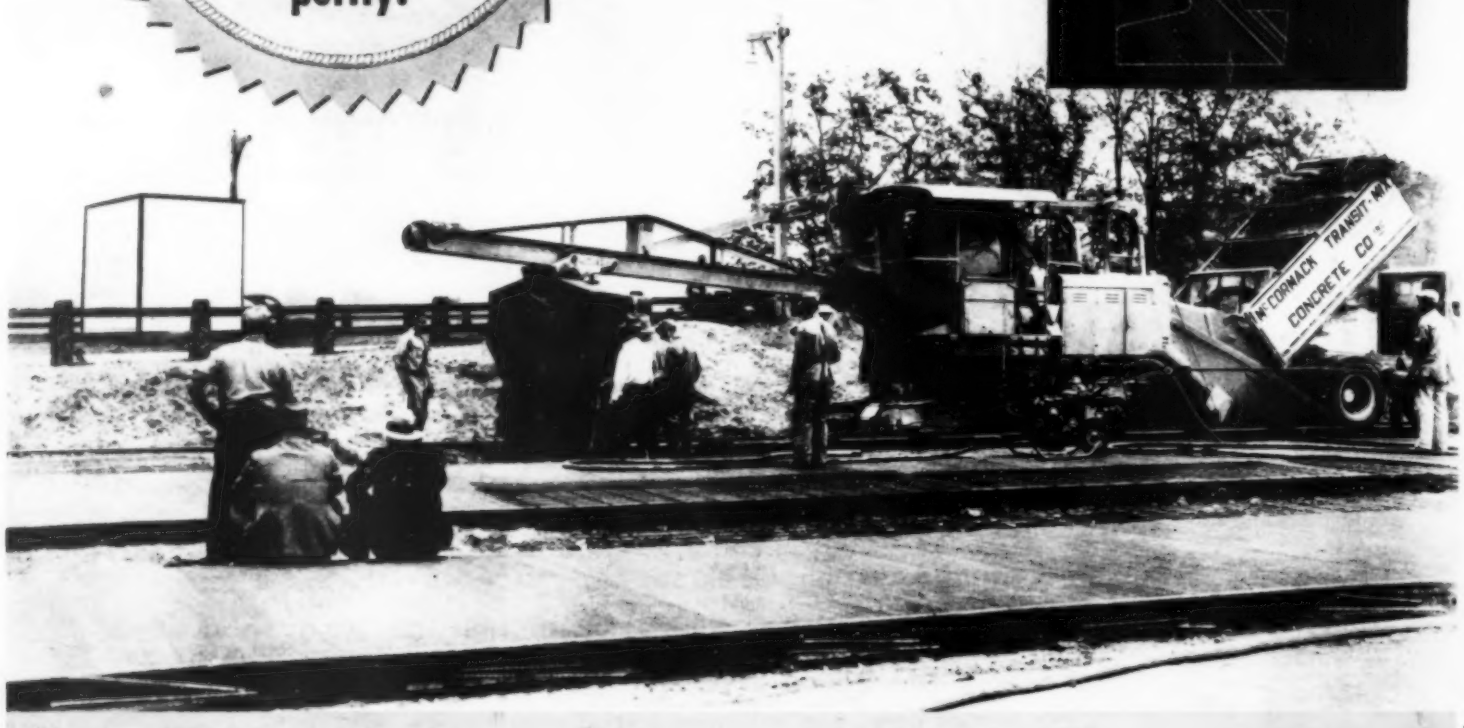
Timken Bearing mounting as used on the drum rollers of the Koehring 34-E Unibatch Paver





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